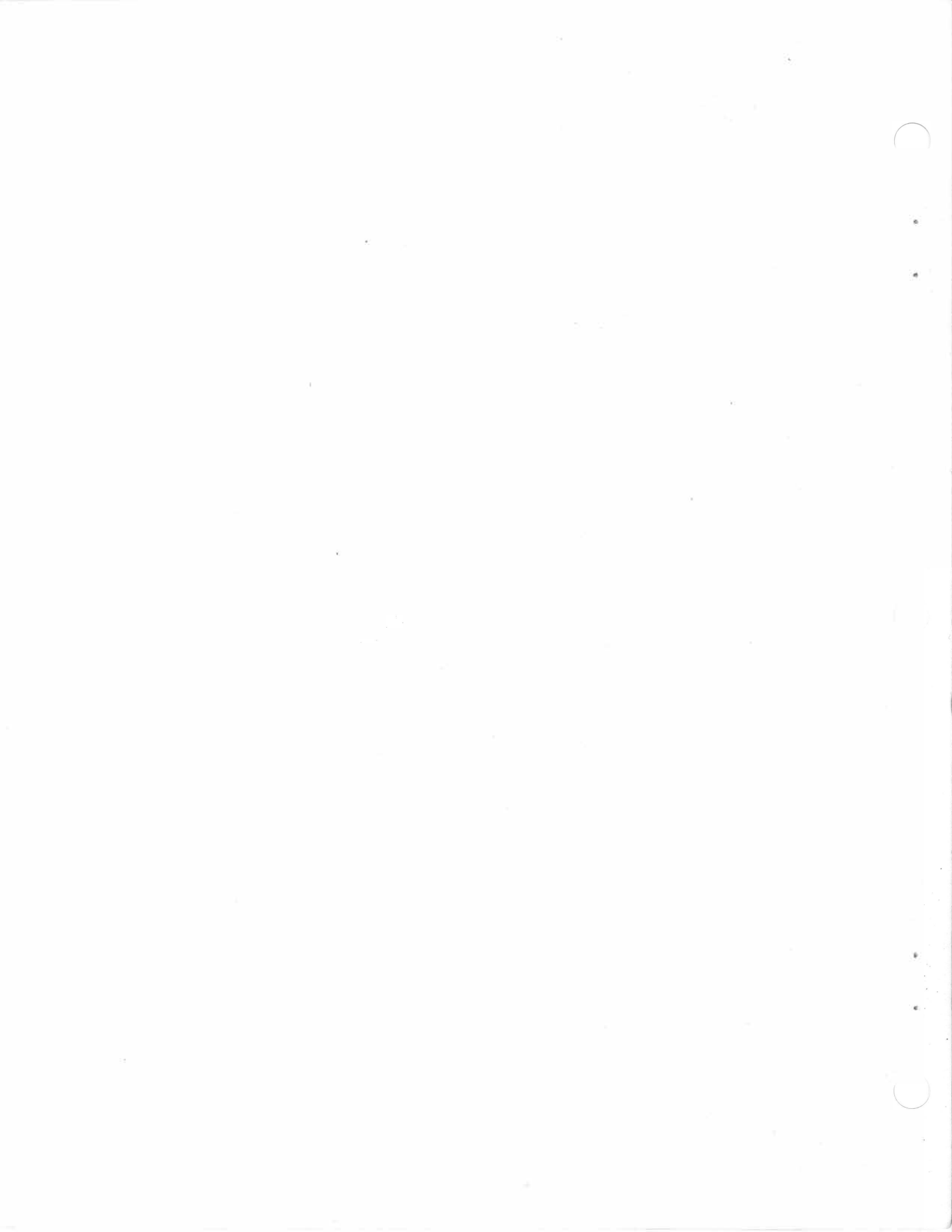


# INSTRUCTION MANUAL

DATA EAST PINBALL <sup>®</sup>

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# GAME SPECIFICATIONS

## POWER REQUIREMENTS

The power source outlet used must include a proper ground. Lack of proper grounding will allow a shock hazard to exist and may affect game operation.

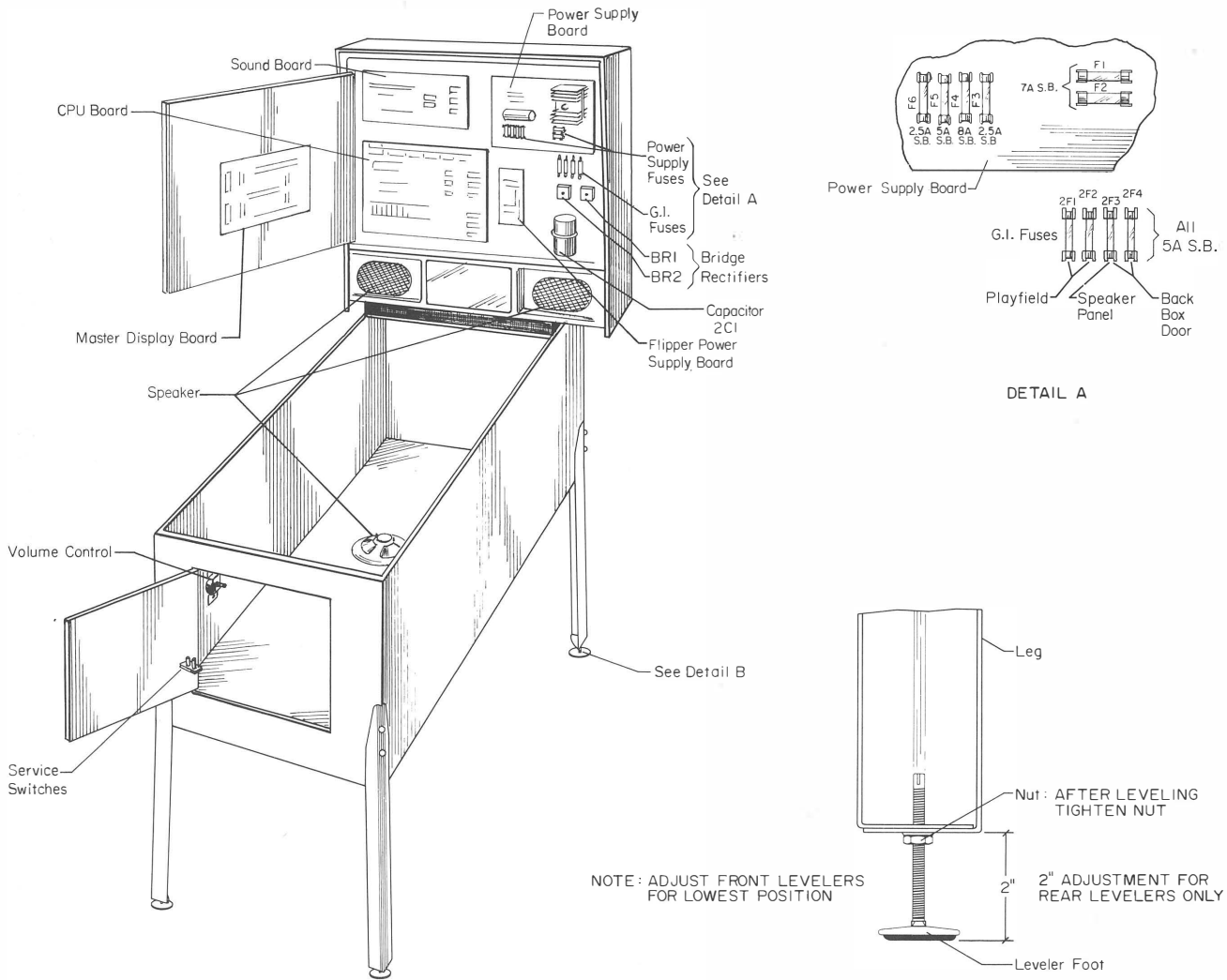
## VOLTAGE REQUIREMENTS ARE AS FOLLOWS:

U.S.A. = 106vac to 129vac

FOREIGN = 207vac to 229vac

If line voltage is other than specified; refer to cabinet A.C. Wiring Diagram for low and high line voltage connection.

## CONTROL & FUSE LOCATIONS



NOTE: ADJUST FRONT LEVELERS FOR LOWEST POSITION

## GAME ILLUSTRATION

DETAIL B

## CIRCUIT BOARD PROM LOCATIONS

CPU Board: Uses 1 PROM: Location 5C

Sound Board: Uses 3 PROMS: Locations 7J (Voice ROM 1), 6J (Voice ROM 2), 5J (Sound ROM).

## **ANGLE OF PLAYFIELD**

Incline of playfield will affect difficulty of game play. Incline should be adjusted to recommended setting. With playfield in lowered position, check the side to side level of playfield and adjust leg levelers as necessary. Check front to back incline of playfield and adjust leg levelers for an incline of 6 to 7½ degrees of incline. If incidence meter is not available, adjust front levelers for lowest position and rear levelers so bottom of legs are approximately 2 inches from floor.

## **TRANSPORTATION**

When transporting this pinball machine, the backbox must be lowered and secured to cabinet. Cabinet legs must be removed and unit must be secured to transporting vehicle. Failure to comply with these instructions may result in damage to unit.

## **FCC**

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference in which the user at his own expense will be required to take whatever measures may be required to correct the interference.

## **DATA EAST LIMITED WARRANTY**

Data East USA, Inc., ("Seller") warrants only to the initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the warranty period specified:

PRINTED CIRCUIT BOARDS (GAME LOGIC)      60 DAYS

No other parts of Seller's product are warranted.

Warranty periods are effective from initial date of shipment from Seller to its' authorized distributors.

Seller's sole liability shall be, at its option, to repair or replace products which are returned to Seller during the warranty periods specified, provided:

1. Seller is notified promptly upon discovery by purchaser that stated products are defective.
2. Such products are properly packaged and then returned freight prepaid, to Seller's plant.

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the Seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Data East USA, product.

## **WARRANTY DISCLAIMER**

EXCEPT AS SPECIFICALLY PROVIDED IN A WRITTEN CONTRACT BETWEEN SELLER AND PURCHASER. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## GAME ASSEMBLY PROCEDURES

1. Lay carton on side with game cabinet bottom down. Remove all packing material (cabinet legs are located in corner packing material). Slide game out of carton and remove parts package from cash box. Locate 4 leg levelers and 8 leg bolts in parts package and attach leg levelers to cabinet legs. Hex nuts on leg levelers must be on leveler before threading leveler in leg.
2. Support rear of cabinet and attach rear legs using 2 leg bolts for each leg.
3. Support front of cabinet and attach front legs.
4. Reach into opening at top rear of cabinet and extend power cord through opening and seat the cord into pedestal slot. Raise the backbox ensuring no cables are pinched and temporarily secure with clamp on rear of cabinet.

### WARNING!!!!

Game should not be moved with backbox secured by temporary clamp.

5. Remove backbox keys from clip inside of coin door and remove backglass. Open backbox door and install 2 bolts with washers from parts package through holes in bottom of backbox. Check all connectors for proper seating.
6. Remove playfield glass and raise playfield. Raise playfield support bar on inside right of cabinet and insert tip of bar into notch on playfield. Check all cabinet cable connectors for proper seating.
7. Remove plumb tilt, and small steel ball for ball roll tilt from parts package and install on panel on inside left of cabinet.
8. With playfield in lowered position, check the side to side level of playfield and adjust leg levelers as necessary. Check front to back incline of playfield and adjust leg levelers for an incline of 6 to 7½ degrees of incline. If incidence meter is not available, adjust front levelers for lowest position and rear levelers so bottom of rear legs are approximately 2 inches from floor. After levelers are adjusted, tighten hex nuts to bottom of legs (refer to **Game Illustration in Specification Section**).

### NOTICE!!!!

Incline of playfield will affect difficulty of game play. Incline should be adjusted to recommended setting.

9. Check plumb and ball roll tilt and adjust if necessary.

## GAME AUDITING FEATURES

There are 50 Audit Features that allow obtaining of information about coin intake and the effects on game difficulty level due to game adjustments. The **Auditing Features Table** shows each Audit Feature has a description that will be displayed in Players 1, 2, and 3, and a corresponding Audit Number in the ball in play display. Player 4 will display the accumulated total for each Audit Feature. To reset Audit Totals, refer to **Game Feature Adjustments** and utilize adjustment number Ad 46 (RESET AUDIT TOTALS).

### TO ENTER GAME AUDITING FEATURES

With the game in the game over mode, and the FORWARD/REVERSE button in the Forward (up) position, press the STEP button. Players 1, 2 and 4 will display the CPU Board Prom Identification Number, shown as the first item in the **Auditing Features Table**. Press the STEP button again and players 1, 2 and 3 will display the description of Audit Feature number 1. The credit display shows **AU** and the ball in play display shows 01 for Audit 1. Use the STEP button to select the Audit Feature desired. The FORWARD/REVERSE button determines whether the STEP button causes Audit Feature numbers to increase or decrease.

## AUDITING FEATURES TABLE

Audit Number Credit/Ball Display	Audit Description Players 1, 2 & 3 Displays
AU 01	LASER WAR PROM I.D. (Number In Player 4)
AU 02	LEFT COIN CHUTE
AU 03	CENTER COIN CHUTE
AU 04	RIGHT COIN CHUTE
AU 05	PAID CREDITS
AU 06	TOTAL CREDITS
AU 07	FREE CREDITS
AU 08	PERCENTAGE OF FREE CREDITS
AU 09	REPLAY AWARDS
AU 10	PERCENTAGE OF REPLAY AWARDS
AU 11	SPECIAL AWARDS
AU 12	PERCENTAGE OF SPECIAL AWARDS
AU 13	CREDITS FOR MATCH
AU 14	HIGH SCORE CREDITS
AU 15	PERCENTAGE OF HIGH SCORE CREDITS
AU 16	EXTRA BALLS
AU 17	PERCENTAGE OF EXTRA BALLS
AU 18	AVERAGE BALL TIME (Seconds)
AU 19	TOTAL PLAY TIME (Minutes)
AU 20	TOTAL BALLS PLAYED
AU 21	REPLAY 1 AWARDS
AU 22	REPLAY 2 AWARDS
AU 23	REPLAY 3 AWARDS
AU 24	REPLAY 4 AWARDS
AU 25	1 PLAYER GAMES
AU 26	2 PLAYER GAMES
AU 27	3 PLAYER GAMES
AU 28	4 PLAYER GAMES
AU 29	BURN IN CYCLES
AU 30	ATTRACT MODE CYCLES
AU 31	HIGH SCORE AUTO RESETS
AU 32	RAMP LEVEL 1 (1 Ball Play)
AU 33	RAMP AWARDED 2X SCORE
AU 34	RAMP AWARDED 3X SCORE
AU 35	RAMP AWARDED 4X SCORE
AU 36	RAMP AWARDED 5X SCORE
AU 37	ION RAMP (3 Ball Multi-Ball)
AU 38	TARGETS LEVEL 3
AU 39	RED TARGET BANK COMPLETED
AU 40	YELLOW TARGET BANK COMPLETED
AU 41	BLUE TARGET BANK COMPLETED
AU 42	LASER KICK SCORED
AU 43	LASER KICK FLIPPER RETURN LANES LIT
AU 44	LASER KICK FLIPPER RETURN LANES SCORED
AU 45	LEVEL 2 BALL MULTI-BALL
AU 46	LEVEL 3 BALL MULTI-BALL
AU 47	BONUS HOLDOVER LIT ON RAMP
AU 48	BONUS HOLDOVER SCORED
AU 49	EXTRA BALL LIT ON RAMP
AU 50	SPECIAL LIT ON RAMP
AU 50	EXTRA BALL LIT BY W—A—R

## GAME FEATURE ADJUSTMENTS

There are 47 adjustable functions available to assist in ensuring the game difficulty level and percentage of free play are correct for a given location. Refer to the **Feature Adjustments Table** for a quick reference to the adjustable features and to Adjustment Details for further information.

The **Feature Adjustments Table** shows each adjustment option has a description that will be displayed in players 1, 2 and 3 and a corresponding adjustment number displayed in the ball in play display. Player 4 displays the setting of each adjustment with the table showing the factory setting for each.

### TO ENTER GAME FEATURE ADJUSTMENTS

With the game in game over mode and the FORWARD/REVERSE button in the Forward (up) position, press the STEP button. Players 1, 2 and 4 will display the CPU BOARD **Prom Identification Number** shown as the first item in the Auditing Features Table. Press the STEP button again and players 1, 2 and 3 will display and description of Audit Feature number 1. The credit display shows **AU**, and the ball in play display shows 01 for Audit 1. Press the STEP button to cycle through the audit features. Once the last audit feature (AU 50) is passed, players 1, 2 and 3 will display the description of Adjustment 1 (refer to **Feature Adjustments Table**). The credit display shows **Ad**, and the ball in play display shows 01 for Adjustment 1. Player 4 displays the present setting of the displayed adjustment. Use the STEP button to select the adjustment number desired, and the GAME START button to change the setting of each adjustment. The FORWARD/REVERSE button determines whether the STEP and GAME START buttons will cause numbers to increase or decrease.

### NOTICE!!!!

When all adjustments are final, you must exit the adjustment mode by pressing the STEP button through the last adjustment number which transfers the game to the game over mode. This is necessary to lock in any changes.

### ADJUSTMENT DETAILS

#### REPLAYS (Ad 01 through 06)

There are 4 possible replay score levels that are adjustable and can be set to award a credit or extra ball as each level is exceeded. Replays can be adjusted to FIXED levels or to an AUTOMATIC setting that will monitor and change the score levels to maintain a preset percentage of free play awarded for replay levels.

#### Ad 01 AUTOMATIC/FIXED REPLAY

**AUTOMATIC:** Adjust for percentage of free play awarded for replay levels; 1% through 50%. Proceed to Ad 2 and 3 for other auto settings.

**FIXED:** Lower the setting value below 1% and player 1, displays fixed. Proceed to Ad 2 through 5 for other fixed settings.

#### Ad 02 REPLAY START/REPLAY 1

**AUTOMATIC:** With Ad 01 set for automatic, adjust for the starting score level of 1st replay; 800,000 through 2,400,000.

**FIXED:** With Ad 01 set for fixed, adjust for replay 1 score level; 100,000 through 9,900,000. 00 = Off.



## FEATURE ADJUSTMENT TABLE

Credit / Ball Display Adjustment Number	Audit Description  Players 1, 2 & 3 Displays	Factory Setting
AD 01	AUTOMATIC/FIXED REPLAY	10%
AD 02	REPLAY START/REPLAY 1	1,700,000
AD 03	REPLAY LEVELS/REPLAY 2	01
AD 04	REPLAY 3 (FIXED ONLY)	00
AD 05	REPLAY 4 (FIXED ONLY)	00
AD 06	REPLAY AWARD	CREDIT
AD 07	SPECIAL AWARD	CREDIT
AD 08	MATCH FEATURE	ON
AD 09	BALLS PER GAME	03
AD 10	TILT WARNING	
AD 11	MAXIMUM EXTRA BALLS	05
AD 12	MAXIMUM CREDITS	30
AD 13	HIGHEST SCORES	ON
AD 14	HIGH SCORE CREDITS LEVEL 1	03
AD 15	HIGH SCORE CREDITS LEVEL 2	00
AD 16	HIGH SCORE CREDITS LEVEL 3	00
AD 17	HIGH SCORE CREDITS LEVEL 4	00
AD 18	HIGH SCORE RESET	1,000
AD 19	FREE PLAY	OFF
AD 20	EJECT BASES SPOT TARGETS	ON
AD 21	W—A—R LANES MEMORY	ON
AD 22	SPECIAL MEMORY	OFF
AD 23	TARGET MEMORY	ON
AD 24	STANDARD/CUSTOM PRICING SELECT	USA 1 COIN
AD 25	LEFT COIN SWITCH UNITS	OFF
AD 26	CENTER COIN SWITCHES UNITS	OFF
AD 27	RIGHT COIN SWITCH UNITS	OFF
AD 28	COIN SWITCH UNITS REQUIRED FOR 1 CREDIT	OFF
AD 29	COIN SWITCH UNITS REQUIRED FOR 1 BONUS CREDIT	OFF
AD 30	INSTALL ADD—A—BALL	OFF
AD 31	INSTALL 5 BALL PLAY	OFF
AD 32	INSTALL NOVELTY PLAY	OFF
AD 33	INSTALL EXTRA EASY	OFF
AD 34	INSTALL EASY	OFF
AD 35	INSTALL MEDIUM	ON
AD 36	INSTALL HARD	ON
AD 37	INSTALL EXTRA HARD	OFF
AD 38	ARROW MEMORY	ON
AD 39	RAMP SPOTS BONUS	ON
AD 40	ATTRACT MODE SOUNDS	ON
AD 41	W—A—R LANES EXTRA BALL	ON
AD 42	TARGETS TO LIGHT SPECIAL	06
AD 43	RAMP LIGHTS FLIPPER LANES	OFF
AD 44	FLIPPER RETURN LANES	OFF
AD 45	LASER KICK	ON
AD 46	AUDITS RESET	OFF
AD 47	RESTORE FACTORY SETTINGS	OFF

### **Ad 03 REPLAY LEVELS/REPLAY 2**

**AUTOMATIC:** With 01 set for auto, adjust for number of replay levels to be active; 1 through 4. Replay score levels 2, 3 and 4 will automatically be adjusted higher in accordance with Ad 02. Proceed to Ad 06.

**FIXED:** With Ad 01 set for fixed, adjust for replay 2 score level; 100,000 through 9,900,000, 00= Off.

### **Ad 04 REPLAY 3 (Fixed Only)**

With Ad 01 set for fixed, adjust for replay 3 score level, 100,000 through 9,900,000.00 = Off.

### **Ad 05 REPLAY 4 (Fixed Only)**

With Ad 01 set for fixed, adjust for replay 4 score level; 100,000 through 9,900,000, 00= Off.

### **Ad 06 REPLAY AWARD**

Adjust for exceeding replays to award; credit, extra ball, or audit (no award but record for audit totals).

### **Ad 07 SPECIAL AWARD**

Adjust for special to award; credit, extra ball, or score level.

### **Ad 08 MATCH FEATURE**

Adjust for match feature; on or off.

### **Ad 09 BALLS PER GAME**

Adjust for 1 through 9 balls per game.

### **Ad 10 TILT WARNING**

Adjust for number of plumb tilts to and ball in play; 1 through 5.

### **Ad 11 MAXIMUM EXTRA BALLS**

Adjust for maximum number of extra balls that may be accumulated during play; 1 through 9.

### **Ad 12 MAXIMUM CREDITS**

Adjust for maximum number of credits that may be accumulated; 5 through 99.

#### **HIGH SCORE LEVELS (Ad 13 through 18)**

There are 4 high score levels with players initials that are displayed during game over. If a players score exceeds one of these levels, the player may enter their initials to the score and it will replace the level exceeded. These levels may be adjusted to award credits and to reset to factory settings after an adjustable number of games.

### **Ad 13 HIGHEST SCORES**

Adjust to enable or disable 4 high score levels; on or off.

### **Ad 14 HIGH SCORE CREDITS LEVEL 1**

Adjust for number of credits to be awarded for exceeding level 1; 0 through 9.

### **Ad 15 HIGH SCORE CREDITS LEVEL 2**

Adjust for number of credits to be awarded for exceeding level 2; 0 through 9.

**Ad 16 HIGH SCORE CREDITS LEVEL 3**

Adjust for number of credits to be awarded for exceeding level 3; 0 through 9.

**Ad 17 HIGH SCORE CREDITS LEVEL 4**

Adjust for number of credits to be awarded for exceeding level 4; 0 through 9.

**Ad 18 HIGH SCORE RESET**

Adjust for high score levels to reset to factory settings after adjusted number of games; 1,000 through 99,000, or Off (no reset).

**Ad 19 FREE PLAY**

Adjust for free play; on or off.

**Ad 20 EJECT BASES SPOT TARGETS**

Adjust for eject to light 1 associated target; on or off.

**Ad 21 W-A-R LANES MEMORY**

Adjust for lit W-A-R lanes to have ball to ball memory; on or off.

**Ad 22 SPECIAL MEMORY**

Adjust for lit special to have ball to ball memory; on or off.

**Ad 23 TARGET MEMORY**

Adjust for lit targets to have ball to ball memory; on or off.

**GAME PRICING (Ad 24 through 29)**

There are two methods available for coin switch programming Standard and Custom. Standard pricing allows you to use one adjustment number (Ad 24) to program pricing schemes shown in the **Standard Pricing Table**. Custom Pricing allows programming of pricing schemes not shown in the table, by programming adjustment numbers Ad 25 through 29. In order to program Ad 25 through 29, Ad 24 must be set to custom. Refer to Custom Pricing for details on custom schemes.

**Ad 24 STANDARD PRICING SELECT**

Adjust for coin switch pricing scheme selected from STANDARD PRICING TABLE, or for CUSTOM (when adjusted for CUSTOM, you must change Ad 25 through 29 according to CUSTOM PRICING section).

## STANDARD PRICING TABLE

Ad 24 Standard Pricing Select Players 1,2,3, & 4 Displays	Coin Mechs			Plays/Coins		
	Left	Center	Right	Left	Center	Right
USA 1 COINS	25¢	\$1.00	25¢	1 PLAY/2 COIN	4 PLAY/1 COIN	1 PLAY/1 COIN
USA 4 COINS	25¢	\$1.00	25¢	1 PLAY/2 COIN 2 PLAY/3 COIN 3 PLAY/4 COIN	3 PLAY/1 COIN	1 PLAY/2 COIN 2 PLAY/3 COIN 3 PLAY/4 COIN
USA 2 COINS	25¢	\$1.00	25¢	1 PLAY/2 COIN	2 PLAY/1 COIN	1 PLAY/2 COIN
AUSTRIA	5SCH	10SCH	10SCH	1 PLAY/2 COIN 2 PLAY/3 COIN 3 PLAY/4 COIN	1 PLAY/1 COIN 3 PLAY/2 COIN	1 PLAY/1 COIN 3 PLAY/2 COIN
AUSTRALIA	20¢		\$1.00	1 PLAY/2 COIN		3 PLAY/1 COIN
UNITED KINGDOM	10P	50P	10P	1 PLAY/1 COIN	5 PLAY/1 COIN	1 PLAY/1 COIN
SWITZERLAND	1F		2F	1 PLAY/1 COIN 3 PLAY/2 COIN		3 PLAY/1 COIN
BELGIUM	5F	5F	20F	1 PLAY/2 COIN 2 PLAY/3 COIN 3 PLAY/4 COIN	1 PLAY/2 COIN 2 PLAY/3 COIN 3 PLAY/4 COIN	3 PLAY/1 COIN
GERMANY 1	1DM	2DM	5DM	1 PLAY/1 COIN 3 PLAY/2 COIN 5 PLAY/3 COIN 7 PLAY/4 COIN 9 PLAY/5 COIN	3 PLAY/1 COIN 7 PLAY/2 COIN 10 PLAY/3 COIN 14 PLAY/4 COIN	9 PLAY/1 COIN
GERMANY 2	1DM	2DM	5DM	1 PLAY/1 COIN 6 PLAY/5 COIN	2 PLAY/1 COIN 7 PLAY/3 COIN	6 PLAY/1 COIN
NETHERLANDS	1HFI	2-5HFI	2-5HFI	1 PLAY/1 COIN 6 PLAY/5 COIN	3 PLAY/1 COIN	3 PLAY/1 COIN
SWEDEN	1KR	5KR	5KR	1 PLAY/3 COIN 2 PLAY/5 COIN	2 PLAY/1 COIN	2 PLAY/1 COIN
FRANCE	1F	5F	10F	1 PLAY/3 COIN 2 PLAY/5 COIN	2 PLAY/1 COIN	4 PLAY/1 COIN
ITALY	500L		500L	1 PLAY/1 COIN		1 PLAY/1 COIN
SPAIN	25P		100P	1 PLAY/1 COIN		5 PLAY/1 COIN
JAPAN		100¥			2 PLAY/1 COIN	

## CUSTOM PRICING (Ad 25 through 29)

With Ad 24 set to custom, Ad 25, 26 and 27 (coin switch units) represent left, center and right coin switch units (not credits). The value setting of each of these adjustments determines the number of units temporarily stored in memory for each associated coin switch closure. For example, if Ad 25 is set to a value of 02, when the left coin switch is closed, the CPU memory will temporarily store two units. What the CPU does with those two units, is determined by Ad 28 (coin switch units required for credit). The value setting of Ad 28 determines the quantity of coin switch units required to post one credit. If Ad 28 is set for a value of 01 (1 unit required for 1 credit); with Ad 25 (left coin switch units) set for a value of 02 as in the above example, each left coin switch closure would cause two credits to be posted.

Units for bonus credits are determined by Ad 29. For example, if Ad 29 is set for a value of 04, the program will boost one bonus credit for every four coin switch units (not credits) stored. Refer to **Custom Pricing Chart** for examples.

### Ad 25 LEFT COIN SWITCH UNITS

Adjust for units stored (not credits) for each left coin switch closure; 0 through 99.

### Ad 26 CENTER COIN SWITCH UNITS

Adjust for units stored (not credits) for each center coin switch closure; 0 through 99.

### Ad 27 RIGHT COIN SWITCH UNITS

Adjust for units stored (not credits) for each center coin switch closure; 0 through 99.

### Ad 28 COIN SWITCH UNITS REQUIRED FOR 1 CREDIT

Adjust for units required for coin switch closures to award 1 credit; 0 through 99.

### Ad 29 COIN SWITCH UNITS REQUIRED FOR 1 BONUS CREDIT

Adjust for units required for coin switch closures to award 1 bonus credit; 0 through 99.

## CUSTOM PRICING TABLE

Coin Mechs			Plays/Coins	Adjustment Numbers					
Left	Center	Right		24	25	26	27	28	29
25¢	\$1.00	25¢	1 PLAY/25¢ 3 PLAYS/50¢	Ad 24 must be set to custom	01	04	01	01	02
			1 PLAY/25¢ 5 PLAY/\$1.00		01	04	01	01	04
			1 PLAY/25¢ 6 PLAY/\$1.00		05	20	05	04	00
			1 PLAY/50¢ 3 PLAY/\$1.00		01	04	01	02	04

## **STANDARD INSTALL ADJUSTMENT FEATURES (Ad 30 through 37)**

There are 8 INSTALL ADJUSTMENT features that when activated, will automatically change a multiple of adjustments. After adjustments are made to these features, the individual adjustment that were affected may be re-adjusted if desired. Adjustments 33 through 37 affect difficulty level of game play. For a list of the individual adjustments that change, refer to INSTALL ADJUSTMENT TABLE.

### **Ad 30 INSTALL ADD-A-BALL**

Adjust for all free play to be replaced by extra balls; on or off.

If Activated:

Ad 06 Replay Awards = Extra Ball

Ad 07 Special Awards = Extra Ball

Ad 08 Match Feature = Off

Ad 14 High Score Credits 1 = 0

Ad 15 High Score Credits 2 = 0

Ad 16 High Score Credits 3 = 0

Ad 17 High Score Credits 4 = 0

### **Ad 31 INSTALL 5 BALL PLAY**

Adjust for 5 balls per game; on or off.

If activated:

Ad 01 Automatic Replay = 7%

Ad 02 Replay Start = 2,400,000

Ad 03 Replay Levels = 01

Ad 20 Ejects Spot Targets = Off

Ad 39 Ramp Spots Bonus = Off

Ad 41 W-A-R Lanes Extra Ball = Off

Ad 42 Targets To Light Special = 09

Ad 43 Ramp Lights Flipper Lanes = Off

### **Ad 32 INSTALL NOVELTY PLAY**

Adjust for no free play or extra balls; on or off.

If activated:

Ad 01 Auto/Fixed Replay = Fixed

Ad 02 Replay 1 = 00

Ad 03 Replay 2 = 00

Ad 04 Replay 3 = 00

Ad 05 Replay 4 = 00

Ad 06 Replay Award = Audit

Ad 07 Special Award = Score

Ad 08 Match Feature = Off

Ad 11 Maximum Extra Balls = Off

Ad 14 High Score Credits 1 = 00

Ad 15 High Score Credits 2 = 00

Ad 16 High Score Credits 3 = 00

Ad 17 High Score Credits 4 = 00

Ad 18 High Score Reset = Off

**Ad 33 INSTALL EXTRA EASY**

Adjust for extra easy level of play difficulty; on or off. Refer to **Install Adjustment Table** for details.

**Ad 34 INSTALL EASY**

Adjust for easy level of play difficulty; on or off. Refer to **Install Adjustment Table** for details.

**Ad 35 INSTALL MEDIUM**

Adjust for medium level of play difficulty; on or off. Refer to **Install Adjustment Table** for details.

**Ad 36 INSTALL HARD**

Adjust for hard level of play difficulty; on or off. Refer to **Install Adjustment Table** for details.

**Ad 37 INSTALL EXTRA HARD**

Adjust for extra hard level of play difficulty; on or off. Refer to **Install Adjustment Table** for details.

## INSTALL ADJUSTMENT TABLE

Install Adjustment	Eject Base Spots Target Ad20	W-A-R Lanes Memory Ad21	Special Memory Ad22	Target Memory Ad23	Arrow Memory Ad38	Ramp Spots Bonus Ad39	W-A-R Extra Ball Ad41	Targets For Special Ad42	Ramp Lights Returns Ad43	Flipper Return Lanes Ad44
AD33 EXTRA-EASY	ON	ON	ON	ON	ON	ON	ON	03	ON	ON
AD34 EASY	ON	ON	OFF	ON	ON	ON	ON	06	OFF	ON
AD35 MEDIUM	ON	ON	OFF	ON	ON	ON	ON	06	OFF	OFF
AD36 HARD	OFF	ON	OFF	ON	ON	OFF	OFF	09	OFF	OFF
AD37 EXTRA-HARD	OFF	OFF	OFF	OFF	OFF	OFF	OFF	09	OFF	OFF

**Ad 38 ARROW MEMORY**

Adjust for ramp and eject arrows to have ball to ball memory; on or off.

**Ad 39 RAMP SPOTS BONUS**

Adjust for ramp to spot 3k of bonus for each color; on or off.

**Ad 40 ATTRACT MODE SOUNDS**

Adjust for sounds during attract mode; on or off.

**Ad 41 W-A-R LANES EXTRA BALL**

Adjust for W-A-R lanes to light ramp for extra ball after 5x bonus multiplier; on or off.

**Ad 42 TARGETS TO LIGHT SPECIAL**

Adjust for number of lit targets required to light special during 3 ball multiple ball play; 3 through 9.

**Ad 43 RAMP LIGHTS FLIPPER LANES**

Adjust for ramp to light flipper return lanes; on or off.

**Ad 44 FLIPPER RETURN LANES**

Adjust for flipper return lanes to be lit at start of each ball; on or off.

**Ad 45 LASER KICK**

Adjust for Laser Kick to be lit at start of each ball; on or off.

**Ad 46 AUDITS RESET**

If resetting Audit Totals is required, adjust this feature to on; and with the forward/reverse button in the forward (up) position, press the step button twice.

**Ad 47 RESTORE FACTORY SETTINGS**

If restoring Factory Settings for game adjustments and zeroing Audit Totals is required, adjust this feature to on; and with the FORWARD/REVERSE button in the FORWARD (up) position, press the STEP button.

**GAME DIAGNOSTICS**

The Data East Pinball system is capable of testing sounds, digital displays, lamps, switches and solenoids. Each feature can be tested either manually or automatically by using the STEP and FORWARD/REVERSE buttons on the coin door and the GAME START button on the front of the cabinet.

Use the automatic tests to quickly verify proper operation of test functions and the manual tests for function troubleshooting.

**TO ENTER GAME DIAGNOSTICS**

With the game in the game over mode, position the FORWARD/REVERSE button in the REVERSE (down) position and press the STEP button. The player displays will show our Toll Free Number for Customer Service 1-800-K-I-C-K-E-R-S.



## SOUND TESTS

The Data East Pinball sound system produces true digital stereo using three channels; left, center (mono) and right. During the Sound Tests the player displays will show the sound board circuit being tested and the associated circuit sounds will be produced. The **Sound Chart** shows that the Rom functions will produce the sounds listed for each Rom and the sine wave functions will produce a 60 cycle tone allowing you to verify all channels are functioning and speakers are connected in phase. It is important that all speakers are in phase to ensure proper sound quality. Refer to **Speaker Phase Testing** to check for proper operation.

## SOUND CHART

<b>Sound Test Auto/Manual</b> Players 1 & 2 Displays	<b>Sounds Produced</b>
LEFT SINE	60 CYCLE TONE (Left Speaker Only)
CENTER SINE	60 CYCLE TONE (All Speakers)
RIGHT SINE	60 CYCLE TONE (Right Speaker Only)
VOICE ROM 1 (Loc. F6)	BLUE, LASER WAR, RETURN,
VOICE ROM 2 (Loc. F4)	EXPLOSION, LAST BALL GOOD LUCK, LAUGH,
	ION CANNON
MUSIC TEST (Sound Rom Loc. F7)	BACKGROUND MUSIC

### SOUND TEST/AUTOMATIC

While game is displaying Toll Free Number, press the STEP button. Players 1 and 2 will display **Sounds Auto** and then cycle through the functions and their associated sounds listed in the **Sound Chart**.

### SOUND TEST/MANUAL

Use the STEP button to advance through the previous test. Players 1 and 2 will display **Sounds Manual** and advance to the first function in the SOUND CHART and produce that sound. Use the GAME START BUTTON to cycle through each sound function and ensure each function produces all sounds listed.

## SPEAKER PHASE TESTING

Each of the three speaker outputs on the sound board has one position and one negative connection. It is important that all speakers have identical connections with regard to the output polarity.

If one speaker is connected having opposite polarity of the others, the sound produced will lack bass frequencies and the result, sounds like a very poor sound system.

To test for proper Speaker Phase, proceed as follows:

Using the Sound Test/Manual, cycle through the Left, Center, and Right Sine functions, listening to the difference in volume and bass that each function produces. The Center sine should produce more volume and bass than Left or Right Sine alone. If the center sine has the same or less, one speaker is out of phase.

To correct improper speaker phasing, use one of the following methods:

1. If speaker terminals are marked positive and negative, then verify that the positive and negative speaker outputs are connected to the proper terminals. If terminals are not marked, proceed to method 2a or 2b.
- 2a. Disconnect one wire only from the bottom cabinet speaker, cycle through the speaker phase test described previously and listen to the volume and bass difference between left, center and right sine functions. When the Center Sine is produced, the left and right speaker will produce the 60 cycle tone at equal levels. If Center Sine lacks volume and bass as compared to Left or Right Sines, then one panel speaker is out of phase (refer to Step 2b). If center produces more volume and bass, the cabinet speaker was out of phase and you must reverse original order of connection.
- 2b. If center had less volume and bass, reverse connections on one of the speaker panel speakers and reconnect cabinet speaker. Cycle through Sound Test/Manual again. If center sine has the same or less volume and bass, reverse the cabinet speaker connections.
3. Disconnect the speaker output connector from the sound board and connect a 1½ volt battery to each pair of speaker wires ensuring the positive battery terminal is connected to the positive speaker wire. (Refer to backbox wiring diagram for sound board speaker connector and wire colors). Check the associated speaker for cone movement. If cone deflects outward the speaker is connected properly.

## DIGITAL DISPLAY TESTS

Digital displays are driven by digit and segment driver circuits. Digit drivers select which of the seven digits on a particular player display should be on and segment drivers select which segments of a particular digit should be on. During the display tests, all displays will cycle through numbers 0 through 9 allowing you to check that segments are being turned on properly. Then each digit of each display will cycle with all segments on, allowing you to check digits are being turned on properly.

### DISPLAY TEST/AUTOMATIC

Use the STEP button to advance through the previous tests. Players 1 and 2 will display *Display Auto* and then cycle through numbers and digits as explained above.

### DISPLAY TEST/MANUAL

Use the STEP button to advance through the previous tests. Players 1 and 2 will display *Display Manual* and then all displays will display zeros. Use the GAME START button to cycle through numbers and digits.

## SWITCH TESTS

Data East Pinball uses an 8 x 8 matrix to detect switches, allowing up to 64 switch possibilities. Refer to **Switch I.D. Chart** and **Playfield Switch Location Illustration** for switch titles, numbers and locations.

There are two switch tests used for checking switch operation; Switch Test and Active Switch Test. Use Switch Test to manually operate switches and verify the associated switch title and number are displayed. Use Active Switch Test to check for stuck switches or switches normally closed by balls.

### SWITCH TEST

Use the STEP button to advance through the previous tests, and players 1 and 2 will display **Switch Test**. Closing a switch will cause players 1 and 2 to display the switch title and the ball in play display will show the switch number.

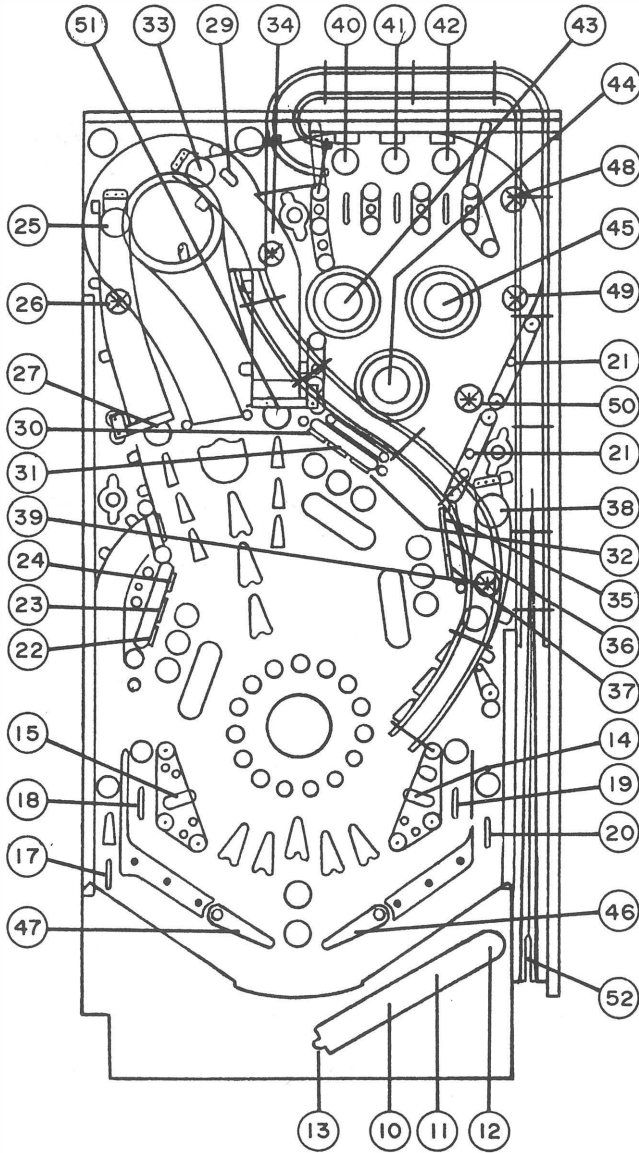
### ACTIVE SWITCH TEST

Use the STEP button to advance through the previous tests. Players 1 and 2 will display **Active Switches** and continuously cycle through any switches that are stuck or closed by balls, the ball in play display will show the switch number.

		SWITCH DRIVES							
		1	2	3	4	5	6	7	8
		GRN- BRN	GRN- RED	GRN- ORN	GRN- YEL	GRN- BLK	GRN- BLU	GRN- VIO	GRN- GRY
INSTRUCTIONS	1	WHT- BRN Plumb Tilt 1	Playfield Tilt 9	Laser Kick 17	Red Eject 25	Yellow Eject 33	"A" 41	Star Yellow (Upper Right) 49	Not Used 57
	2	WHT- RED Ball Roll Tilt 2	Ball Trough 3 10	Left Flipper Return Lane 18	Star Red 26	Yellow Star 34	"R" 42	Star Blue (Upper Right) 50	Not Used 58
	3	WHT- ORN Start Button 3	Ball Trough 2 11	Right Flipper Return Lane 19	Red Spinner 27	Blue Target (Left) 35	Pop Bumper Red 43	Yellow Spinner 51	Not Used 59
	4	WHT- YEL Right Coin 4	Ball Trough 1 12	Right Outlane 20	Not Used 28	Blue Target (Center) 36	Pop Bumper Yellow 44	Shooter Lane 52	Not Used 60
	5	WHT- GRN Center Coin 5	Outhole 13	10 Point Rubber Right (2 Switches) 21	Ramp 29	Blue Target (Right) 37	Pop Bumper Blue 45	Not Used 53	Not Used 61
	6	WHT- BLU Left Coin 6	Sling Shot Right 14	Red Target (Left) 22	Yellow Target (Left) 30	Blue Eject 38	Right E.O.S. 46	Not Used 54	Not Used 62
	7	WHT- VIO Slam Tilt 7	Sling Shot Left 15	Red Target (Center) 23	Yellow Target Spot (Center) 31	Star Blue 39	Left E.O.S. 47	Not Used 55	Not Used 63
	8	WHT- GRY Not Used 8	Not Used 16	Red Target (Right) 24	Yellow Target (Right) 32	"W" 40	Star Red (Upper Right) 48	Not Used 56	Not Used 64

SWITCH I.D. CHART

# PLAYFIELD SWITCH LOCATION ILLUSTRATION



ITEM	DESCRIPTION	PART NO.
9	PLAYFIELD TILT	180-5021-00
10	BALL THROUGH 3	180-5009-00
11	BALL THROUGH 2	180-5009-00
12	BALL THROUGH 1	180-5010-00
13	OUTHOLE	180-5011-00
14	SLING SHOT RIGHT	180-5014-00
15	SLING SHOT LEFT	180-5014-00
16	NOT USED	NOT USED
17	LASER KICK	180-5003-00
18	LEFT FLIPPER RETURN LANE	180-5003-00
19	RIGHT FLIPPER RETURN LANE	180-5003-00
20	RIGHT OUTLANE	180-5003-00
21	10 POINT RUBBER RIGHT (2 SWITCHES)	500-5033-00
22	RED TARGET (LEFT)	500-5035-02
23	RED TARGET (CENTER)	500-5035-02
24	RED TARGET (RIGHT)	500-5035-02
25	RED EJECT	180-5006-00
26	STAR RED	180-5003-00
27	RED SPINNER	180-5004-00
28	NOT USED	NOT USED
29	RAMP	180-5002-00
30	YELLOW TARGET (LEFT)	500-5035-06
31	YELLOW TARGET SPOT (CENTER)	500-5035-06
32	YELLOW TARGET (RIGHT)	500-5035-06
33	YELLOW EJECT	180-5006-00
34	YELLOW STAR	180-5003-00
35	BLUE TARGET (LEFT)	500-5035-05
36	BLUE TARGET (CENTER)	500-5035-05
37	BLUE TARGET (RIGHT)	500-5035-05
38	BLUE EJECT	180-5006-00
39	STAR BLUE	180-5003-00
40	"W"	180-5003-00
41	"A"	180-5003-00
42	"R"	180-5003-00
43	POP BUMPER RED	180-5015-01
44	POP BUMPER YELLOW	180-5015-01
45	POP BUMPER BLUE	180-5015-01
46	RIGHT E.O.S.	180-5018-00
47	LEFT E.O.S.	180-5018-00
48	STAR RED (UPPER RIGHT)	180-5003-00
49	STAR YELLOW (UPPER RIGHT)	180-5003-00
50	STAR BLUE (UPPER RIGHT)	180-5003-00
51	YELLOW SPINNER	180-5004-00
52	SHOOTER LANE	180-5019-00
53-64	NOT USED	NOT USED

## LAMP TESTS

Data East Pinball uses an 8 x 8 matrix to drive lamps, allowing up to 64 lamp possibilities. Refer to **Lamp I.D. Chart and Playfield Lamp Location Illustration** for lamp titles, numbers and locations.

There are four lamp tests to check lamp operations; All Lamps, Lamp Returns, Lamp Drives and Discrete Lamps. Use All Lamps Test to check for bad bulbs and general lamp operation. Use other Lamp Tests for troubleshooting drive and return circuits.

### ALL LAMPS TEST

Use the STEP button to advance through the previous tests. Players 1 and 2 will display **All Lamps** and all controlled lamps will flash continuously.

### LAMP RETURN TEST

Use the STEP button to advance through the previous tests. Players 1 and 2 will display **Lamp Rows**, and the ball in play display shows 01. All the lamps in lamp return 1 will light (refer to **Lamp I.D. Chart**). Press the GAME START button to cycle through the remaining 7 lamp returns and to repeat the cycle.

### LAMP DRIVE TEST

Use the STEP button to advance through the previous tests. Players 1 and 2 will display **Lamp Columns** and the ball in play display shows 01. All the lamps in lamp drive 1 will light (refer to **Lamp I.D. Chart**). Press the GAME START button to cycle through the remaining 7 lamp drives and to repeat the cycle.

### DISCRETE LAMP TEST

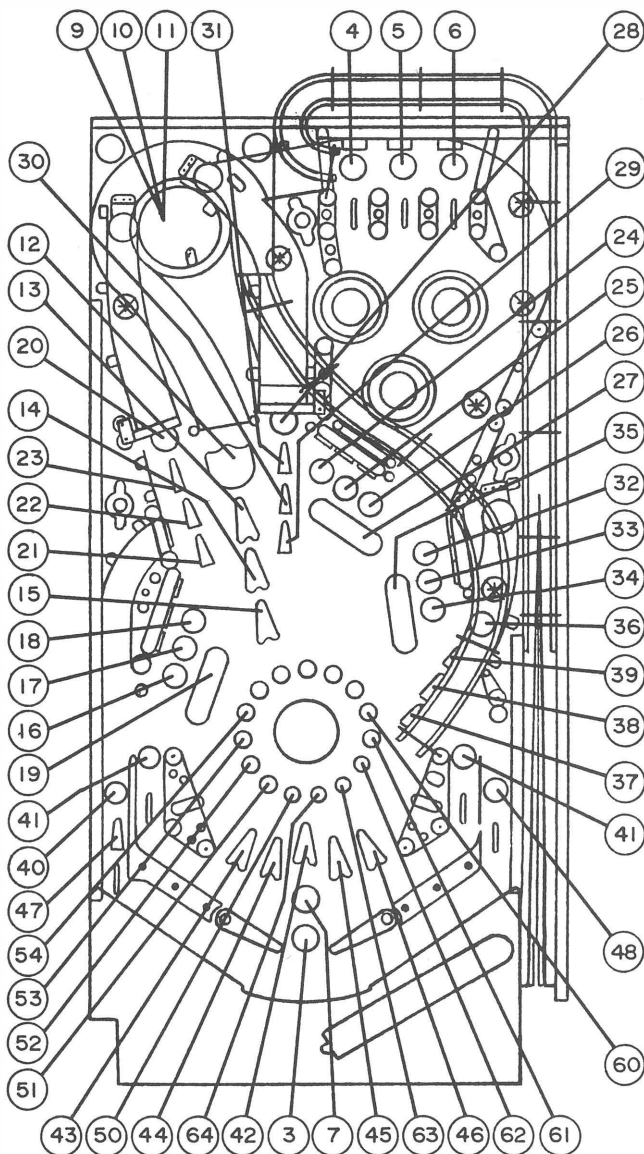
Use the STEP button to advance through the previous tests. Players 1 and 2 will display **Lamp Test** and then the title of lamp number 1 shown in the **Lamp I.D. Chart**. The ball in play display will show the associated lamp number. Press the GAME START button to cycle through the remaining 63 lamps and to repeat the cycle. The FORWARD/REVERSE button determines whether lamp numbers will increase or decrease.

		LAMP DRIVE							
		1	2	3	4	5	6	7	8
		YEL - BRN	YEL - RED	YEL - ORN	YEL - BLK	YEL - GRN	YEL - BLU	YEL - VIO	YEL - GRY
STRUCTURAL	1 RED-BRN	Ball in Play 1	Cannon Red 9	Red Target (Center) 17	Yellow Target (Center) 25	Blue Target (Center) 33	Flipper Return Lanes (Left&Right) 41	Ion Cannon (Tip) 49	Bonus 4K Yellow 57
	2 RED-BLK	Match 2	Cannon Yellow 10	Red Target (Right) 18	Yellow Target (Right) 26	Blue Target (Right) 34	Bonus Holds 42	Bonus 1K Red 50	Bonus 8K Yellow 58
	3 RED-ORN	Blast Again 3	Cannon Blue 11	Hot Dog Red 19	Hot Dog Yellow 27	Hot Dog Blue 35	2 X 43	Bonus 2K Red 51	Bonus 16K Yellow 59
	4 RED-YEL	"W" 4	Ramp Green Shield 12	Lock Eject Red 20	Eject Lock Yellow 28	Eject Blue 36	3 X 44	Bonus 4K Red 52	Bonus 1K Blue 60
	5 RED-GRN	"A" 5	Ramp Orange Arrow 13	Red Eject Arrow Clear 21	Yellow Eject Arrow Clear 29	Blue Eject Arrow Clear 37	4 X 45	Bonus 8K Red 53	Bonus 2K Blue 61
	6 RED-BLU	"R" 6	Ramp Amber Arrow 14	Red Eject Arrow Amber 22	Yellow Eject Arrow Amber 30	Blue Eject Arrow Amber 38	5 X 46	Bonus 16K Red 54	Bonus 4K Blue 62
	7 RED-VIO	Ramp Multiplier 7	Ramp Clear Arrow 15	Red Eject Arrow Orange 23	Yellow Eject Arrow Orange 31	Blue Eject Arrow Orange 39	Loser Kick 47	Bonus 1K Yellow 55	Bonus 8K Blue 63
	8 RED-GRY	Return to Base 8	Red Target (Left) 16	Yellow Target (Left) 24	Blue Target (Left) 32	Left Outlane 40	Right Outlane 48	Bonus 2K Yellow 56	Bonus 16K Blue 64

LAMP I.D. CHART

# PLAYFIELD LAMP LOCATION ILLUSTRATION

## ITEM DESCRIPTION



- 1 BALL IN PLAY (BACK BOX)
- 2 MATCH (BACK BOX)
- 3 BLAST AGAIN
- 4 "W"
- 5 "A"
- 6 "R"
- 7 RAMP MULTIPLIER
- 8 RETRUN TO BASE
- 9 CANNON RED
- 10 CANNON YELLOW
- 11 CANNON BLUE
- 12 RAMP GREEN SHIELD
- 13 RAMP ORANGE ARROW
- 14 RAMP AMBER ARROW
- 15 RAMP CLEAR ARROW
- 16 RED TARGET (LEFT)
- 17 RED TARGET (CENTER)
- 18 RED TARGET (RIGHT)
- 19 HOT DOG RED
- 20 LOCK EJECT RED
- 21 RED EJECT ARROW CLEAR
- 22 RED EJECT ARROW AMBER
- 23 RED EJECT ARROW ORANGE
- 24 YELLOW TARGET (LEFT)
- 25 YELLOW TARGET (CENTER)
- 26 YELLOW TRAGET (RIGHT)
- 27 HOT DOG YELLOW
- 28 EJECT LOCK YELLOW
- 29 YELLOW EJECT ARROW CLEAR
- 30 YELLOW EJECT ARROW AMBER
- 31 YELLOW EJECT ARROW ORANGE
- 32 BLUE TARGET (LEFT)
- 33 BLUE TARGET (CENTER)
- 34 BLUE TARGET (RIGHT)
- 35 HOT DOG BLUE
- 36 EJECT BLUE
- 37 BLUE EJECT ARROW CLEAR
- 38 BLUE EJECT ARROW AMBER
- 39 BLUE EJECT ARROW ORANGE
- 40 LEFT OUTLANE
- 41 FLIPPER RETURN LANES (LEFT AND RIGHT)
- 42 BONUS HOLDS
- 43 2X
- 44 3X
- 45 4X
- 46 5X
- 47 LASER KICK
- 48 RIGHT OUTLANE
- 49 ION CANNON (TIP)
- 50 BONUS 1K RED
- 51 BONUS 2K RED
- 52 BONUS 4K RED
- 53 BONUS 8K RED
- 54 BONUS 16K RED
- 55 BONUS 1K YELLOW
- 56 BONUS 2K YELLOW
- 57 BONUS 4K YELLOW
- 58 BONUS 8K YELLOW
- 59 BONUS 16K YELLOW
- 60 BONUS 1K BLUE
- 61 BONUS 2K BLUE
- 62 BONUS 4K BLUE
- 63 BONUS 8K BLUE
- 64 BONUS 16K BLUE

## COIL TESTS

Data East Pinball uses 22 transistors that when energized will apply ground to an associated coil or flash lamp device. Circuits 1 through 8 are split through the left/right diode board allowing each circuit to control 2 devices which have isolated power sources that are switched by a relay. (Refer to Playfield Coil Wiring Diagram). Refer to **Coil I.D. Chart** for coil title and driver transistor assignments and the **Playfield Coil Location Illustration** for locations.

There are 2 coil tests used to check operation of circuits 1 through 16. The first coil test will automatically cycle through the circuits and the select coil test allows 1 circuit to pulse continually.

Pop bumpers and slingshots are controlled by switched coil circuits 1 through 6. These circuits may be tested by activating their associated switches.

## COIL TEST AUTOMATIC

Use the STEP button to advance through the previous tests. Players 1 and 2 will display **Coil Test** and then the title of coil number 1 shown in the **Coil I.D. Chart**. The ball in play display will show the associated number and coil number 1 will momentarily energize. The displays will cycle, energizing each associated coil allowing you to verify each circuit is operating.

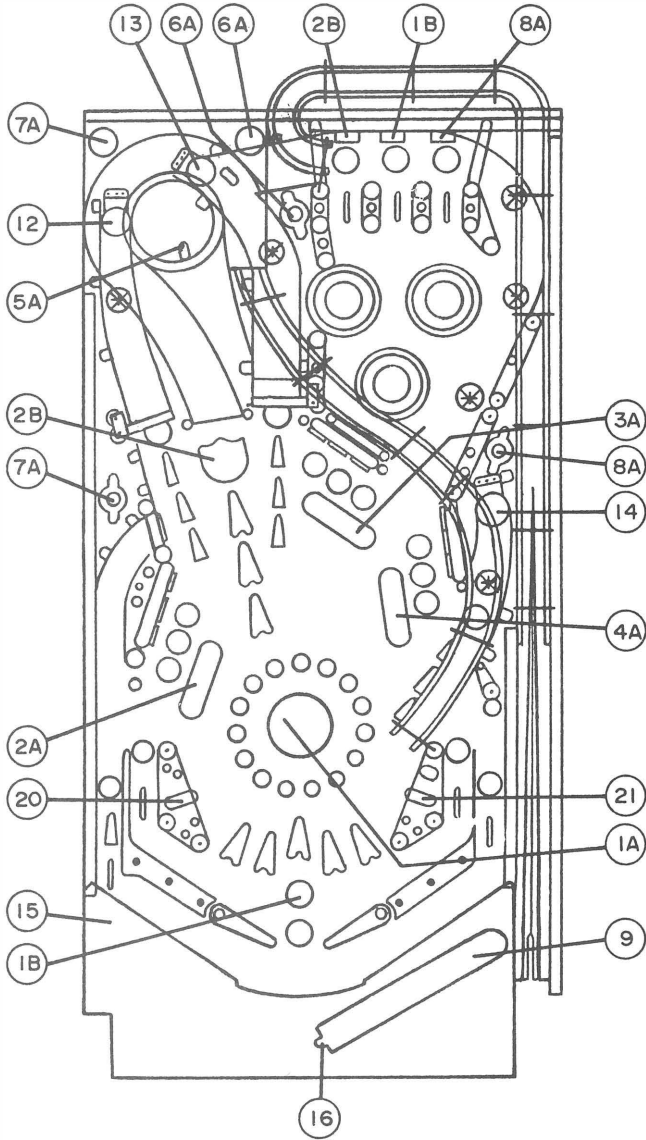
## SELECT COIL TEST

Use the STEP button to advance through the previous tests. Players 1 and 2 will display **Select Coil** and then the title of coil number 1. Use the Game START Button to select the circuit to be tested and press the STEP button to cause that circuit to continually pulse that circuit.

## COIL I.D. CHART

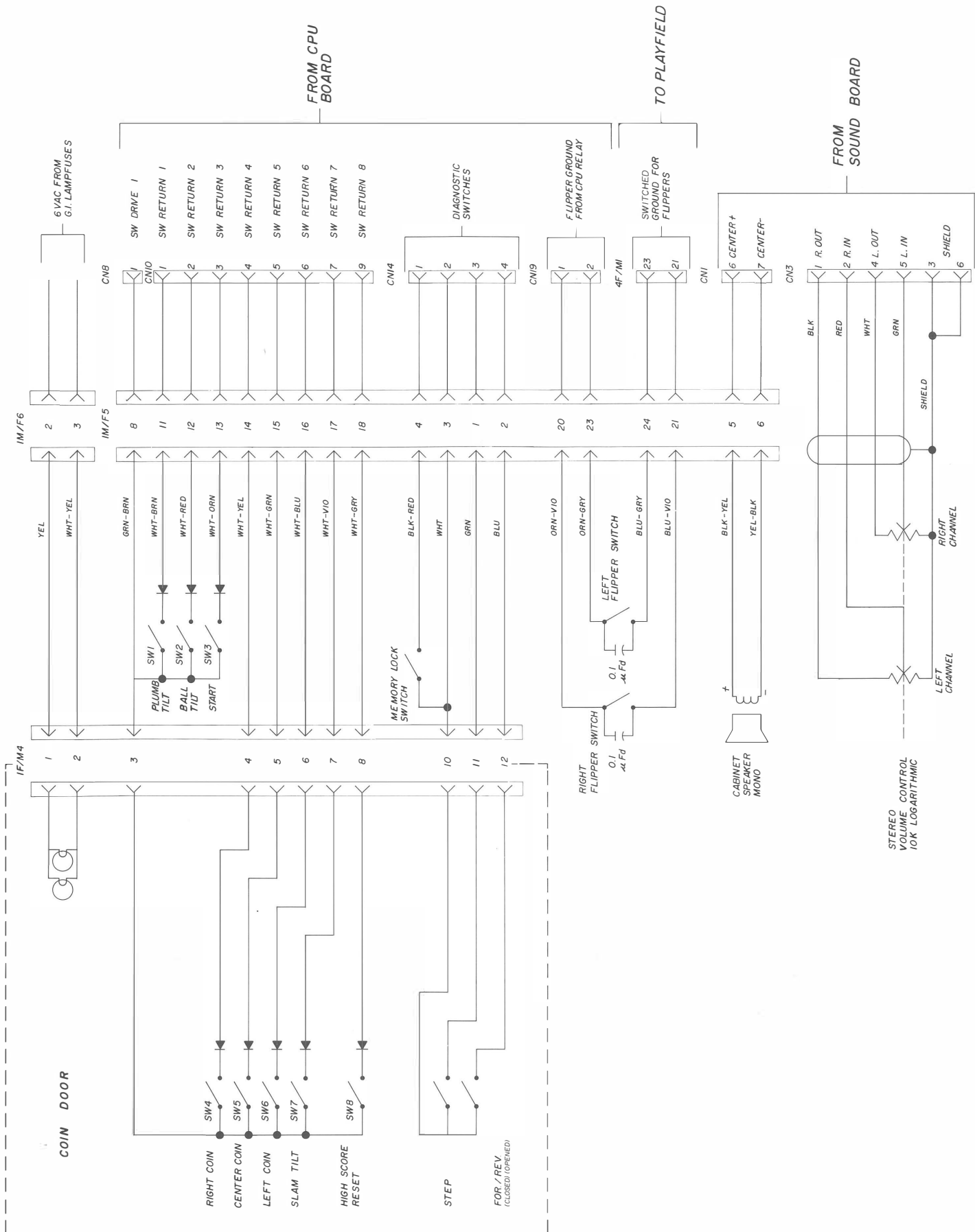
Coil Number Ball/Credit Display	Coil Description Players 1 & 2 Display	Drive Wire	Power Wire	Drive Transistor	Device Type
1L	EXPLOSION	VIO-BRN	BRN	Q 46	#89 BULBS
2L	RAMP MULTIPLIER	BLK-BRN	ORN	Q 46	#89 BULBS
2L	RED HOT DOG	VIO-RED	BRN	Q 45	#89 BULBS
2R	GREEN SHIELD	BLK-RED	ORN	Q 45	#89 BULBS
3L	YELLOW HOT DOG	VIO-ORN	BRN	Q 44	#89 BULBS
3R	WARRIIRS (Back Glass)	BLK-ORN	ORN	Q 44	#89 BULBS
4L	BLUE HOT DOG	VIO-YEL	BRN	Q 43	#89 BULBS
4R	LASER WIRE (Back Glass)	BLK-YEL	ORN	Q 43	#89 BULBS
5L	ION CANNON	VIO-GRN	BRN	Q 42	#89 BULBS
5R	KNOCKER	BLK-GRN	ORN	Q 42	COIL: 23-800
6L	MARS YELLOW	VIO-BLU	BRN	Q 41	COIL: 23-800
6R	NOT USED	BLK-BLU	ORN	Q 41	
7L	MARS RED	VIO-BLK	BRN	Q 40	#89 BULBS
7R	NOT USED	BLK-VIO	ORN	Q 40	
8L	MARS BLUE	VIO-GRY	BRN	Q 39	#89 BULBS
8R	NOT USED	BLK-GRY	ORN	Q 39	
9	BALL TROUGH EJECT	BLK-BRN	RED	Q 30	COIL: 23-840
10	L/R POWER RELAY	BRN-RED	RED	Q 29	RELAY: 24 VDC
11	G. I. RELAY	BRN-ORN	RED	Q 28	RELAY: 24 VDC
12	RED EJECT	BRN-YEL	RED	Q 27	COIL: 27-1500
13	YELLOW EJECT	BRN-GRN	RED	Q 26	COIL: 27-1500
14	BLUE EJECT	BRN-BLU	RED	Q 25	COIL: 27-1500
15	LASER KICK RELAY	BRN-VIO	RED	Q 24	RELAY: 24 VDC
16	OUTHOLE	BRN-GRY	RED	Q 23	COIL: 23-840

# PLAYFIELD COIL LOCATION ILLUSTRATION



ITEM	DESCRIPTION	DEVICE TYPE
1L	EXPLOSION	#89 BULBS
1R	RAMP MULTIPLIER	#89 BULBS
2L	RED HOT DOG	#89 BULBS
2R	GREEN SHIELD	#89 BULBS
3L	YELLOW HOT DOG	#89 BULBS
3R	WARRIORS (BACK GLASS)	#89 BULBS
4L	BLUE HOT DOG	#89 BULBS
5L	ION CANNON	#89 BULBS
5R	KNOCKER	COIL: 23-800
6L	MARS YELLOW	COIL: 23-800
6R	NOT USED	—
7L	MARS RED	#89 BULBS
7R	NOT USED	—
8L	MARS BLUE	#89 BULBS
8R	NOT USED	—
9	BALL THROUGH EJECT	COIL: 23-840
10	L/R POWER RELAY	RELAY: 24 VDC
11	G.I. RELAY	RELAY: 24 VDC
12	RED EJECT	COIL: 27-1500
13	YELLOW EJECT	COIL: 27-1500
14	BLUE EJECT	COIL: 27-1500
15	LASER KICK RELAY	RELAY: 24 VDC
16	OUTHOLE	COIL: 23-840
30	INSTALL ADD-A-BALL	OFF
31	INSTALL 5 BALL PLAY	OFF
32	INSTALL NOVELTY PLAY	OFF
33	INSTALL EXTRA EASY	OFF
34	INSTALL EASY	OFF
35	INSTALL MEDIUM	ON
36	INSTALL HARD	OFF
37	INSTALL EXTRA HARD	OFF
38	ARROW MEMORY	ON
39	RAMP SPOTS BONUS	ON
40	ATTRACT MODE SOUNDS	ON
41	W.A.R. LANES EXTRA BALL	ON
42	TARGETS TO LIGHT SPECIAL	06
43	RAMP LIGHTS FLIPPER LANES	OFF
44	FLIPPER RETURN LANES	OFF
45	LASER KICK	ON
46	AUDITS RESET	OFF
47	RESTORE FACTORY SETTINGS	OFF



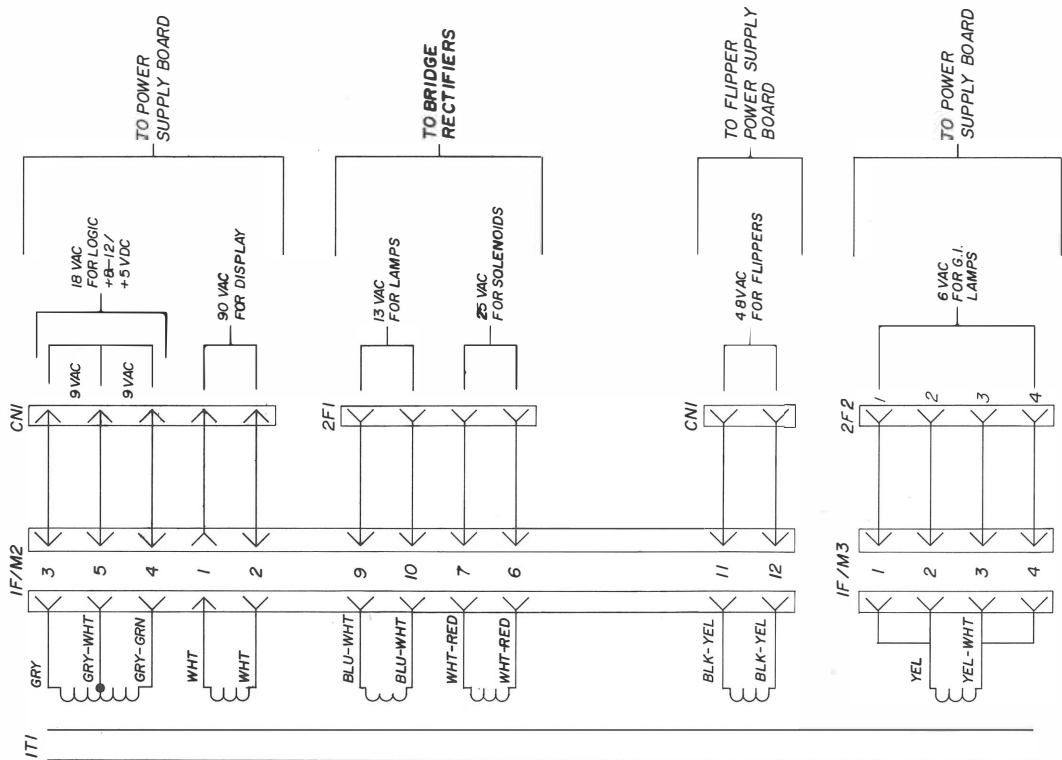
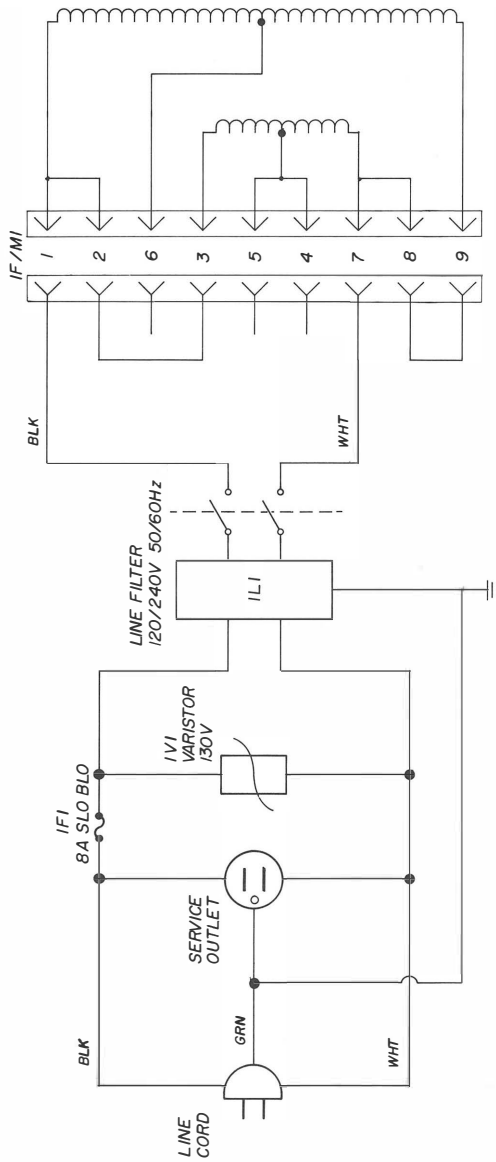


**CABINET WIRING DIAGRAM**

# A.C. POWER WIRING DIAGRAM

## THIS CONFIGURATION FOR 115V

FOR LOWER LINE VOLTAGES  
OR 230 VOLT OPERATION  
SEE SAMPLES BELOW



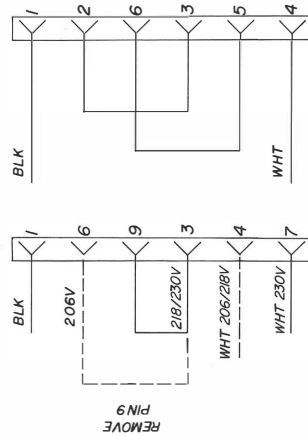
## JUMPERS FOR VOLTAGE VARIATION

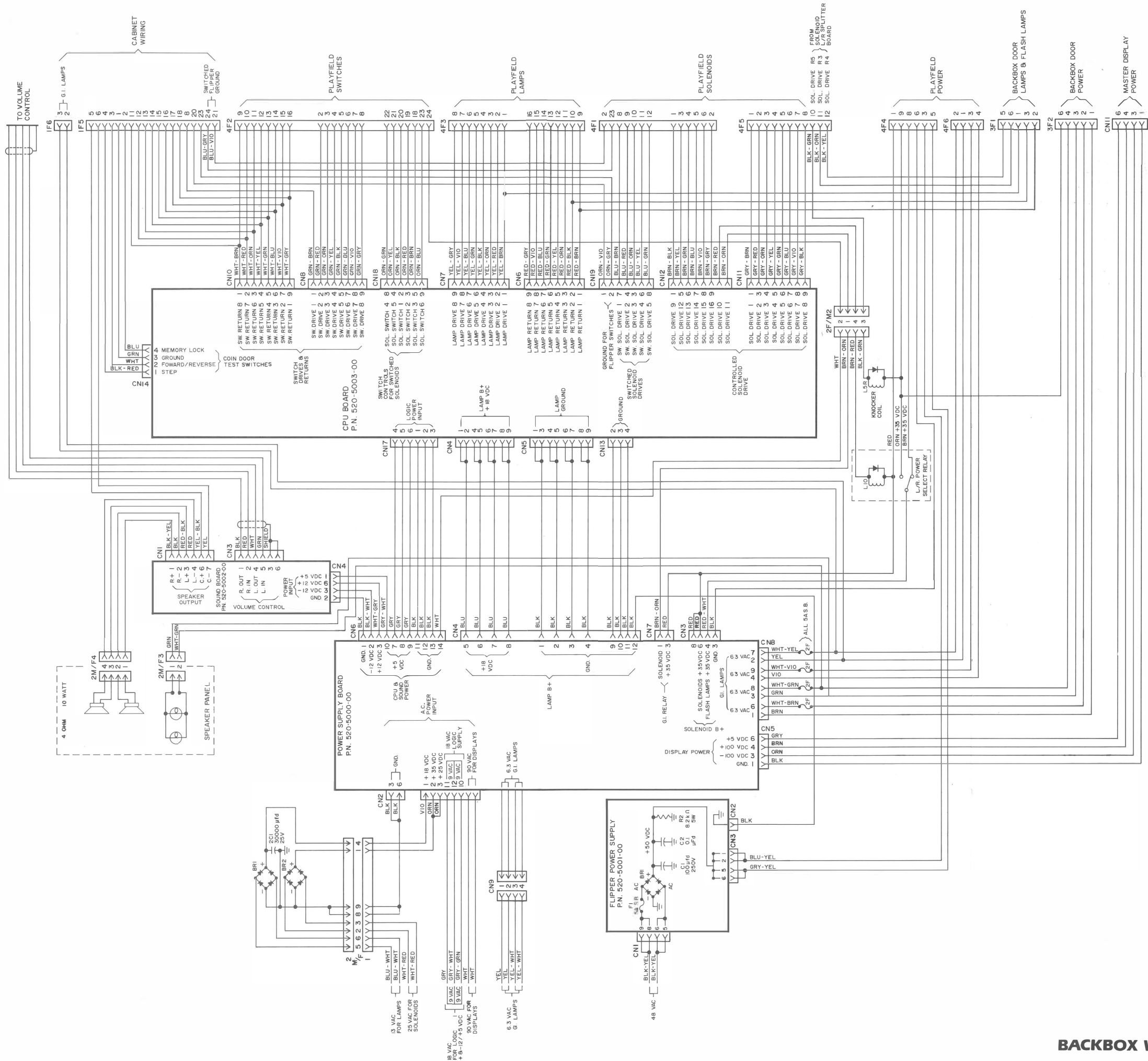
230V/218V/206VOLTS

IF1 = 4A SLO BLO

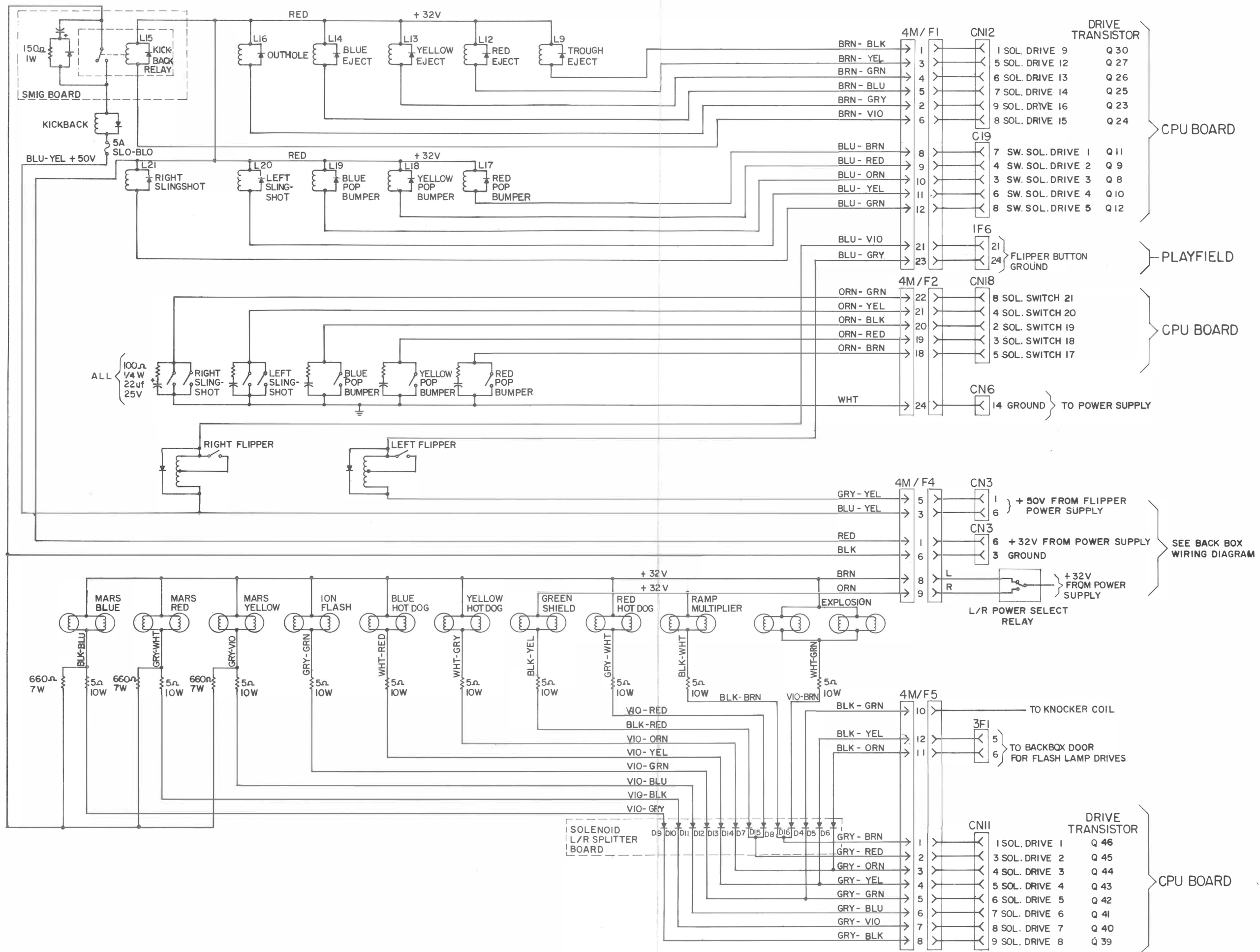
IV1 = 275V VARIATOR

REMOVE PIN9





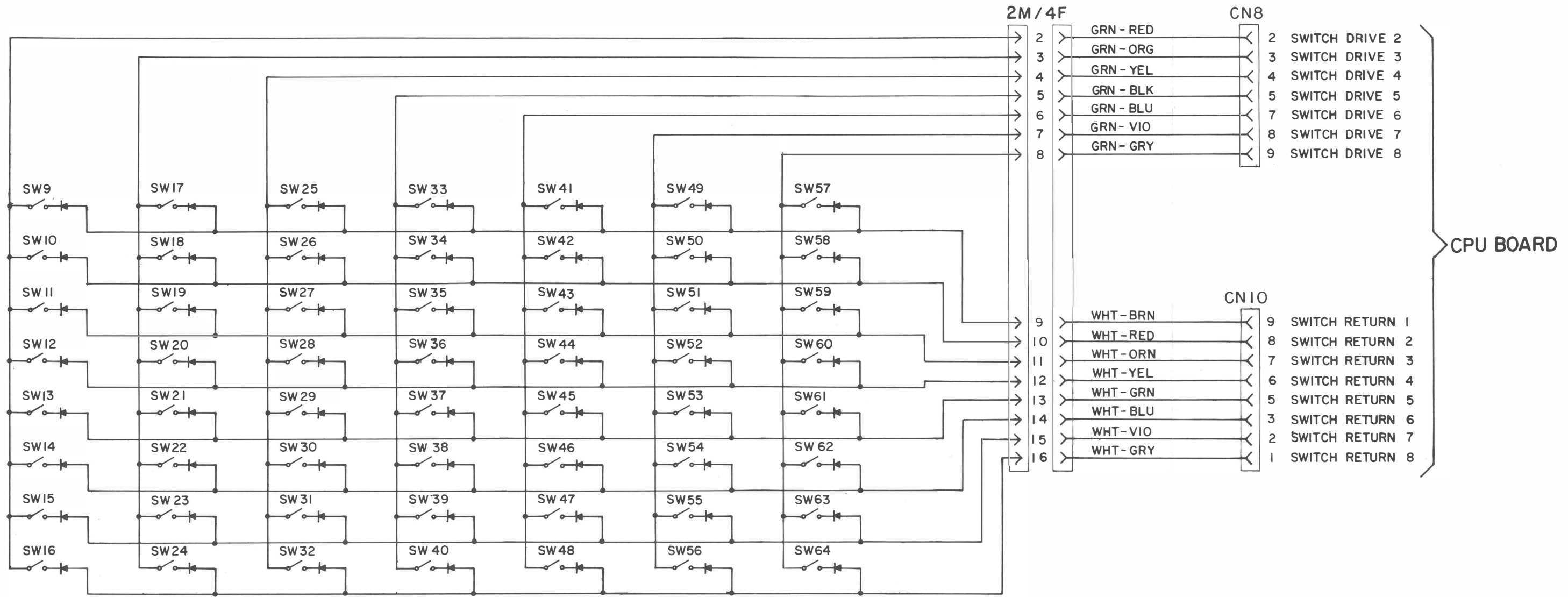
BACKBOX WIRING DIAGRAM



**PLAYFIELD COIL WIRING DIAGRAM**

**SWITCH NUMBER**

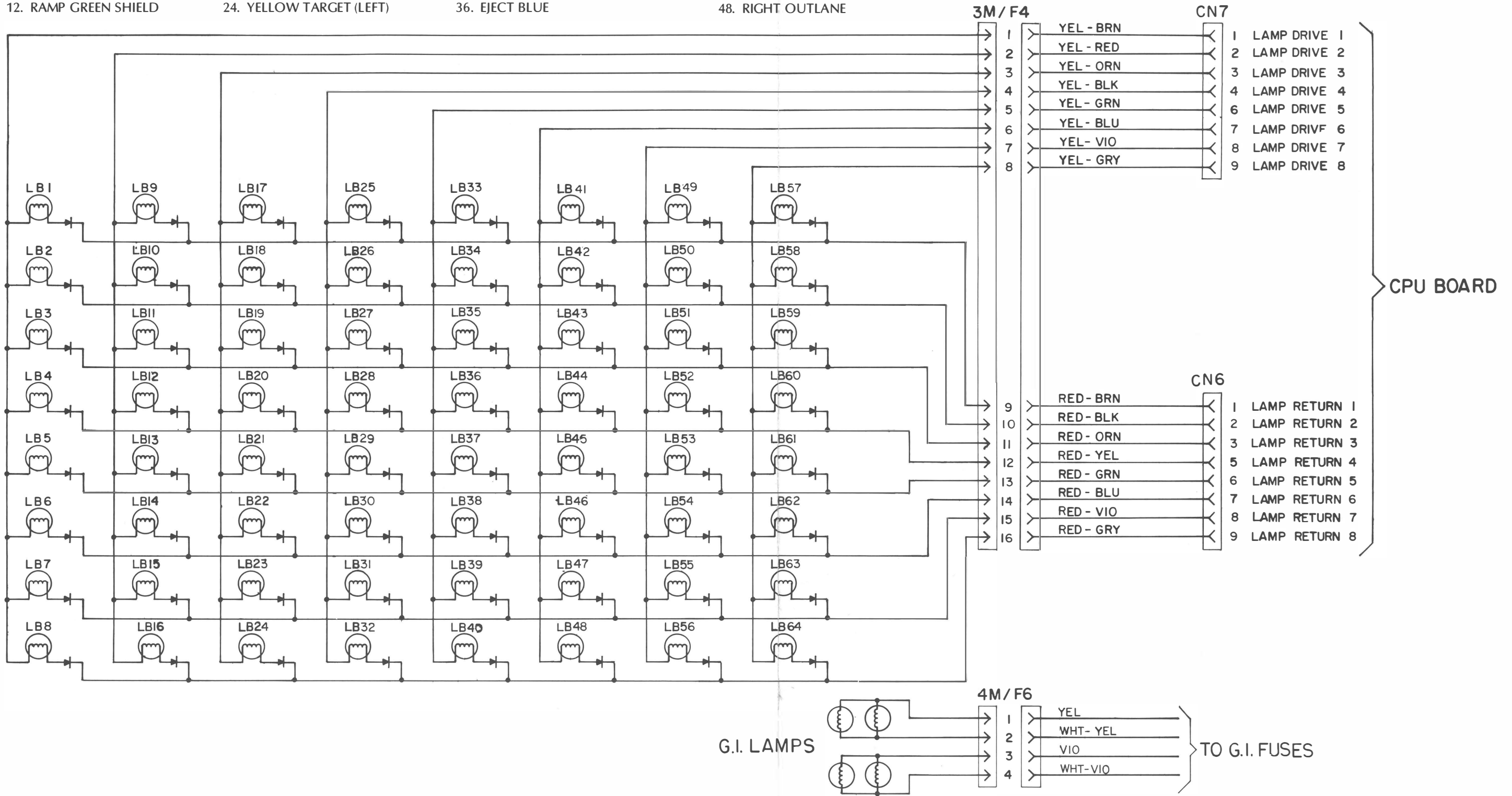
- |                                        |                            |                          |                               |              |
|----------------------------------------|----------------------------|--------------------------|-------------------------------|--------------|
| 9. PLAYFIELD TILT                      | 22. RED TARGET (LEFT)      | 35. BLUE TARGET (LEFT)   | 48. STAR RED (UPPER RIGHT)    | 61. NOT USED |
| 10. BALL TROUGH 3                      | 23. RED TARGET (CENTER)    | 36. BLUE TARGET (CENTER) | 49. STAR YELLOW (UPPER RIGHT) | 62. NOT USED |
| 11. BALL TROUGH 2                      | 24. RED TARGET (RIGHT)     | 37. BLUE TARGET (RIGHT)  | 50. STAR BLUE (UPPER RIGHT)   | 63. NOT USED |
| 12. BALL TROUGH 1                      | 25. RED EJECT              | 38. BLUE EJECT           | 51. YELLOW SPINNER            | 64. NOT USED |
| 13. OUTHOLE                            | 26. STAR RED               | 39. STAR BLUE            | 52. SHOOTER LANE              |              |
| 14. SLING SHOT RIGHT                   | 27. RED SPINNER            | 40. "W"                  | 53. NOT USED                  |              |
| 15. SLING SHOT LEFT                    | 28. NOT USED               | 41. "A"                  | 54. NOT USED                  |              |
| 16. NOT USED                           | 29. RAMP                   | 42. "R"                  | 55. NOT USED                  |              |
| 17. KICK BACK                          | 30. YELLOW TARGET (LEFT)   | 43. POP BUMPER RED       | 56. NOT USED                  |              |
| 18. LEFT FLIPPER RETURN LANE           | 31. YELLOW TARGET (CENTER) | 44. POP BUMPER YELLOW    | 57. NOT USED                  |              |
| 19. RIGHT FLIPPER RETURN LANE          | 32. YELLOW TARGET (RIGHT)  | 45. POP BUMPER BLUE      | 58. NOT USED                  |              |
| 20. RIGHT OUTLANE                      | 33. YELLOW EJECT           | 46. RIGHT E.O.S.         | 59. NOT USED                  |              |
| 21. 10 POINT RUBBER RIGHT (2 SWITCHES) | 34. YELLOW STAR            | 47. LEFT E.O.S.          | 60. NOT USED                  |              |



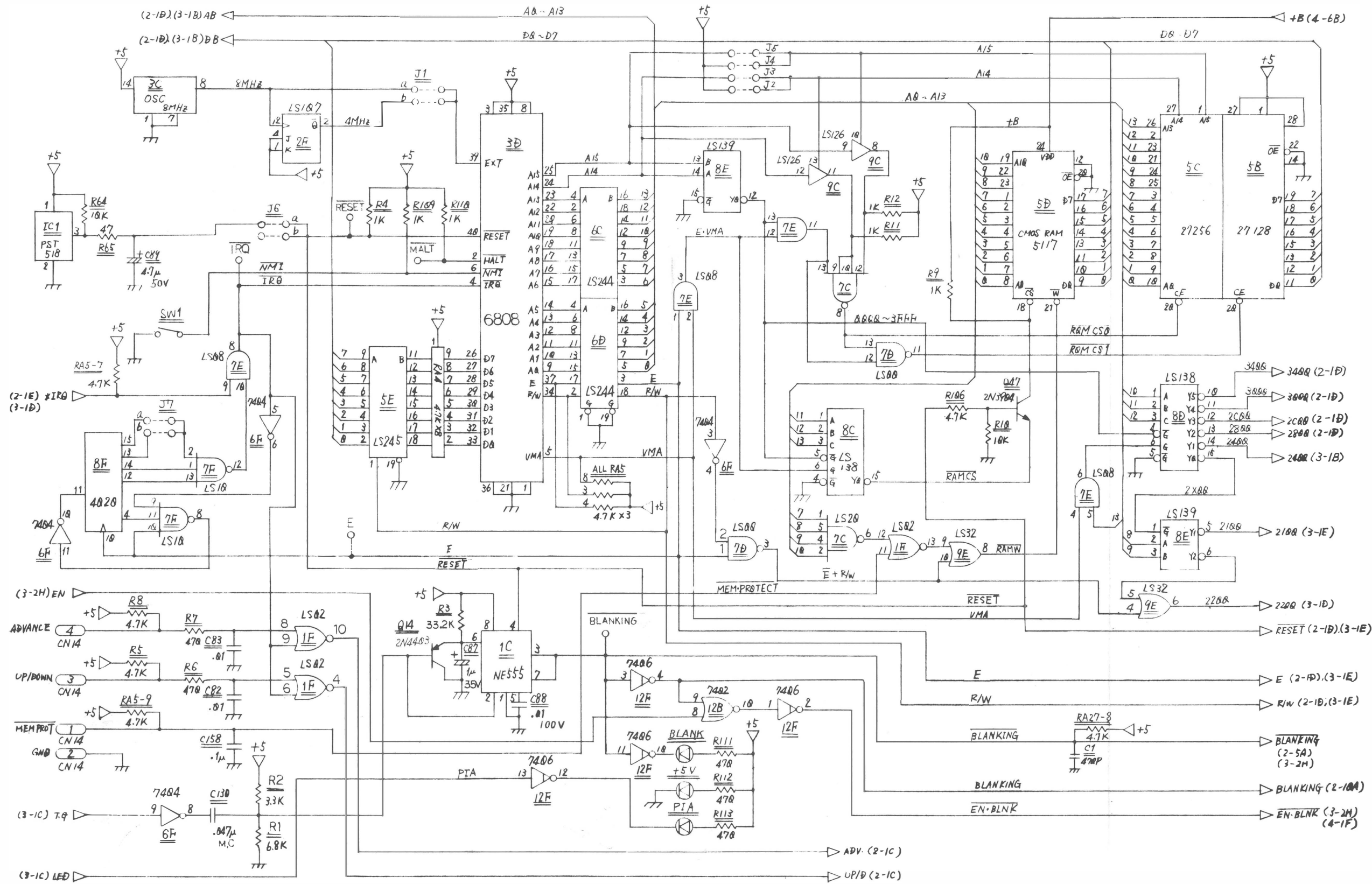
**PLAYFIELD SWITCH WIRING DIAGRAM**

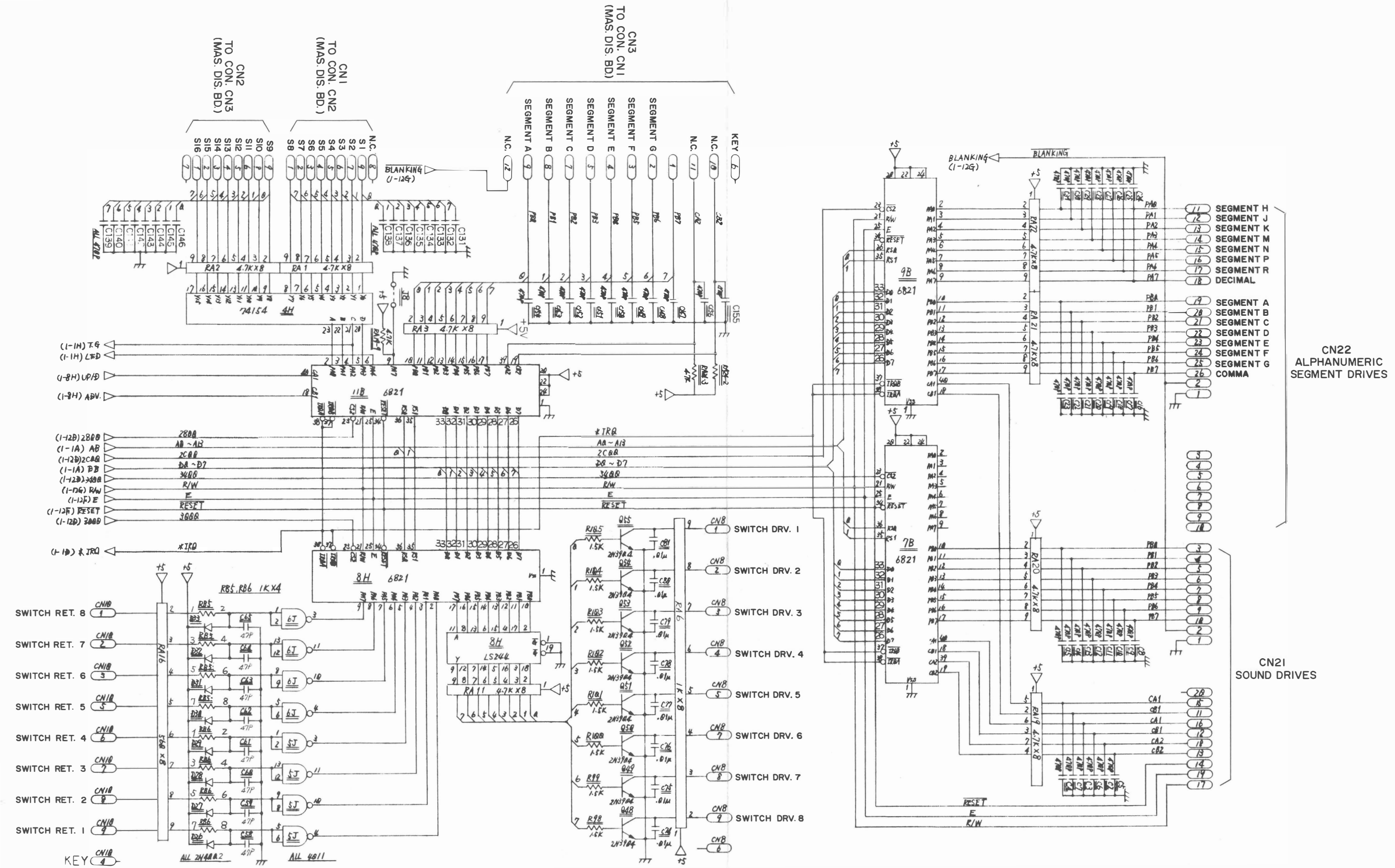
**LAMP NUMBER**

- |                           |                            |                               |                                         |                      |                      |
|---------------------------|----------------------------|-------------------------------|-----------------------------------------|----------------------|----------------------|
| 1. BALL IN PLAY (BACKBOX) | 13. RAMP ORANGE            | 25. YELLOW TARGET (CENTER)    | 37. BLUE EJECT ARROW CLEAR              | 49. ION CANNON (TIP) | 59. BONUS 16K YELLOW |
| 2. MATCH (BACKBOX)        | 14. RAMP AMBER             | 26. YELLOW TARGET (RIGHT)     | 38. BLUE EJECT ARROW AMBER              | 50. BONUS 1K RED     | 60. BONUS 1K BLUE    |
| 3. BLAST AGAIN            | 15. RAMP CLEAR             | 27. HOT DOG YELLOW            | 39. BLUE EJECT ARROW ORANGE             | 51. BONUS 2K RED     | 61. BONUS 2K BLUE    |
| 4. "W"                    | 16. RED TARGET (LEFT)      | 28. EJECT LOCK YELLOW         | 40. LEFT OUTLANE                        | 52. BONUS 4K RED     | 62. BONUS 4K BLUE    |
| 5. "A"                    | 17. RED TARGET (CENTER)    | 29. YELLOW EJECT ARROW CLEAR  | 41. FLIPPER RETURN LANES (LEFT & RIGHT) | 53. BONUS 8K RED     | 63. BONUS 8K BLUE    |
| 6. "R"                    | 18. RED TARGET (RIGHT)     | 30. YELLOW EJECT ARROW AMBER  | 42. BONUS HOLDS                         | 54. BONUS 16K RED    | 64. BONUS 16K BLUE   |
| 7. RAMP UP                | 19. HOT DOG RED            | 31. YELLOW EJECT ARROW ORANGE | 43. 2X                                  | 55. BONUS 1K YELLOW  |                      |
| 8. RETURN TO BASE         | 20. LOCK EJECT RED         | 32. BLUE TARGET (LEFT)        | 44. 3X                                  | 56. BONUS 2K YELLOW  |                      |
| 9. CANNON RED             | 21. RED EJECT ARROW CLEAR  | 33. BLUE TARGET (CENTER)      | 45. 4X                                  | 57. BONUS 4K YELLOW  |                      |
| 10. CANNON YELLOW         | 22. RED EJECT ARROW AMBER  | 34. BLUE TARGET (RIGHT)       | 46. 5X                                  | 58. BONUS 8K YELLOW  |                      |
| 11. CANNON BLUE           | 23. RED EJECT ARROW ORANGE | 35. HOT DOG BLUE              | 47. KICKBACK                            |                      |                      |
| 12. RAMP GREEN SHIELD     | 24. YELLOW TARGET (LEFT)   | 36. EJECT BLUE                | 48. RIGHT OUTLANE                       |                      |                      |



**PLAYFIELD LAMP WIRING DIAGRAM**





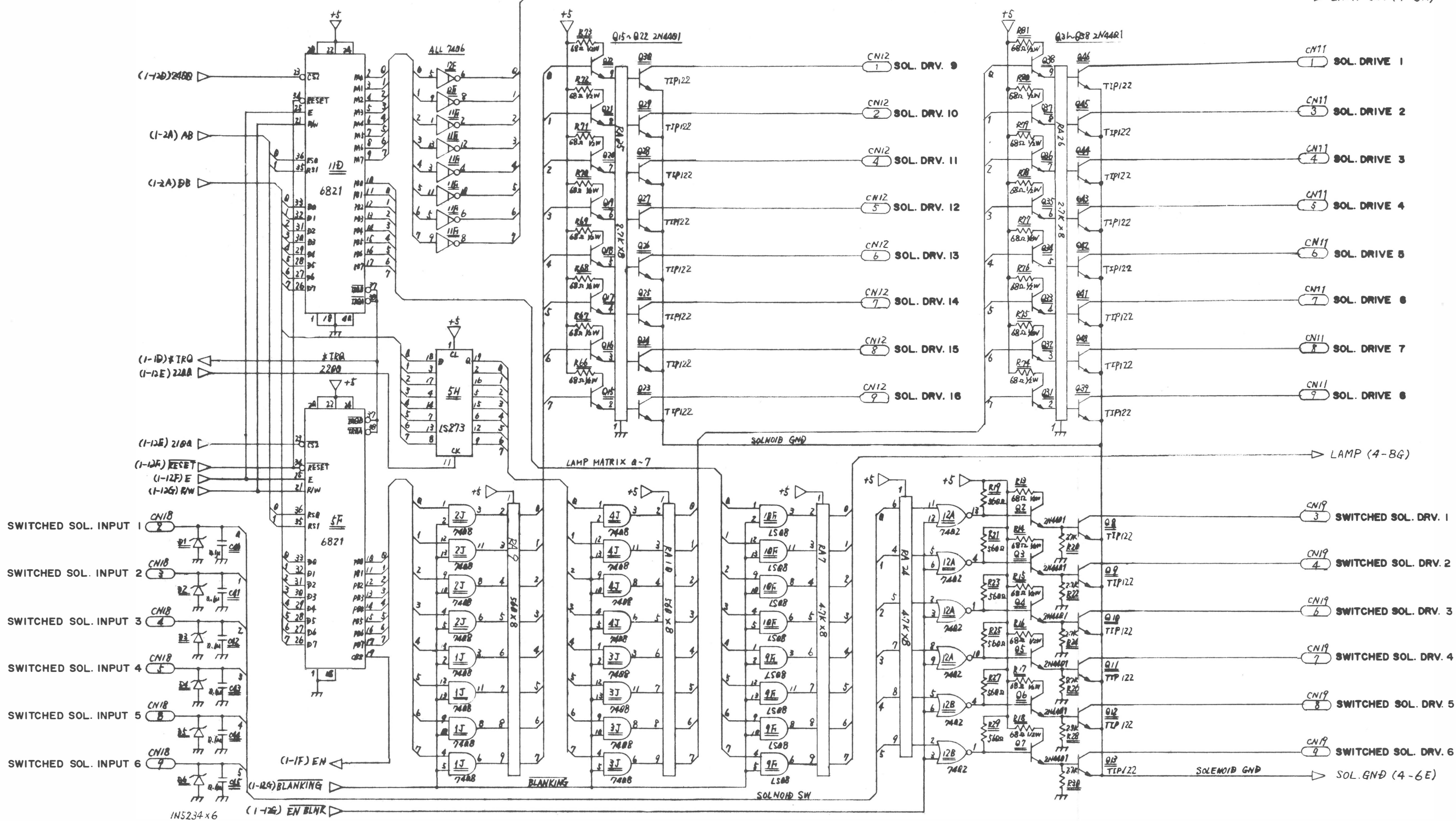
CN22  
ALPHANUMERIC  
SEGMENT DRIVES

- 11 SEGMENT H
- 12 SEGMENT J
- 13 SEGMENT K
- 14 SEGMENT M
- 15 SEGMENT N
- 16 SEGMENT P
- 17 SEGMENT R
- 18 DECIMAL
- 19 SEGMENT A
- 20 SEGMENT B
- 21 SEGMENT C
- 22 SEGMENT D
- 23 SEGMENT E
- 24 SEGMENT F
- 25 SEGMENT G
- 26 COMMA

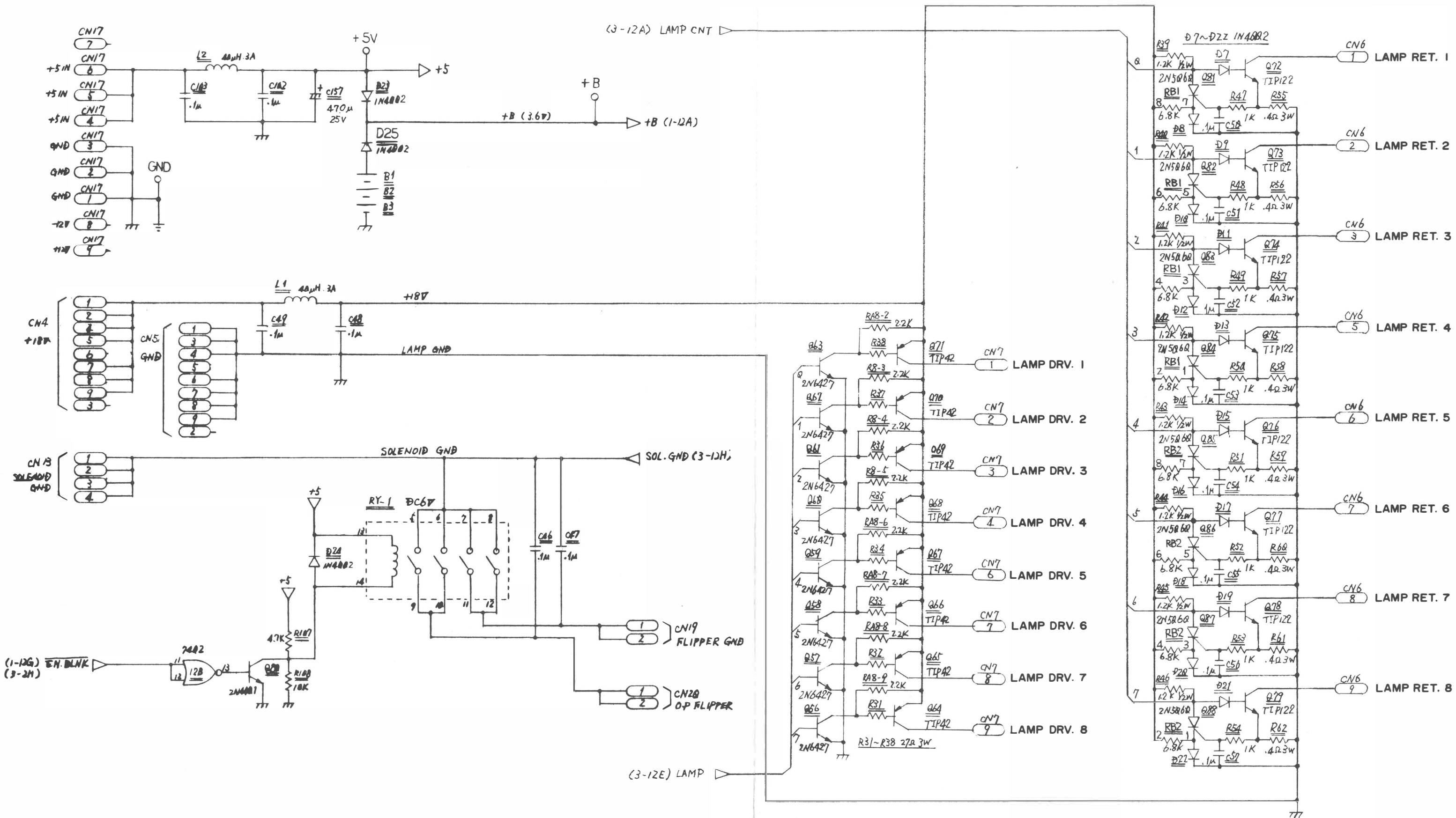
CN21  
SOUND DRIVES

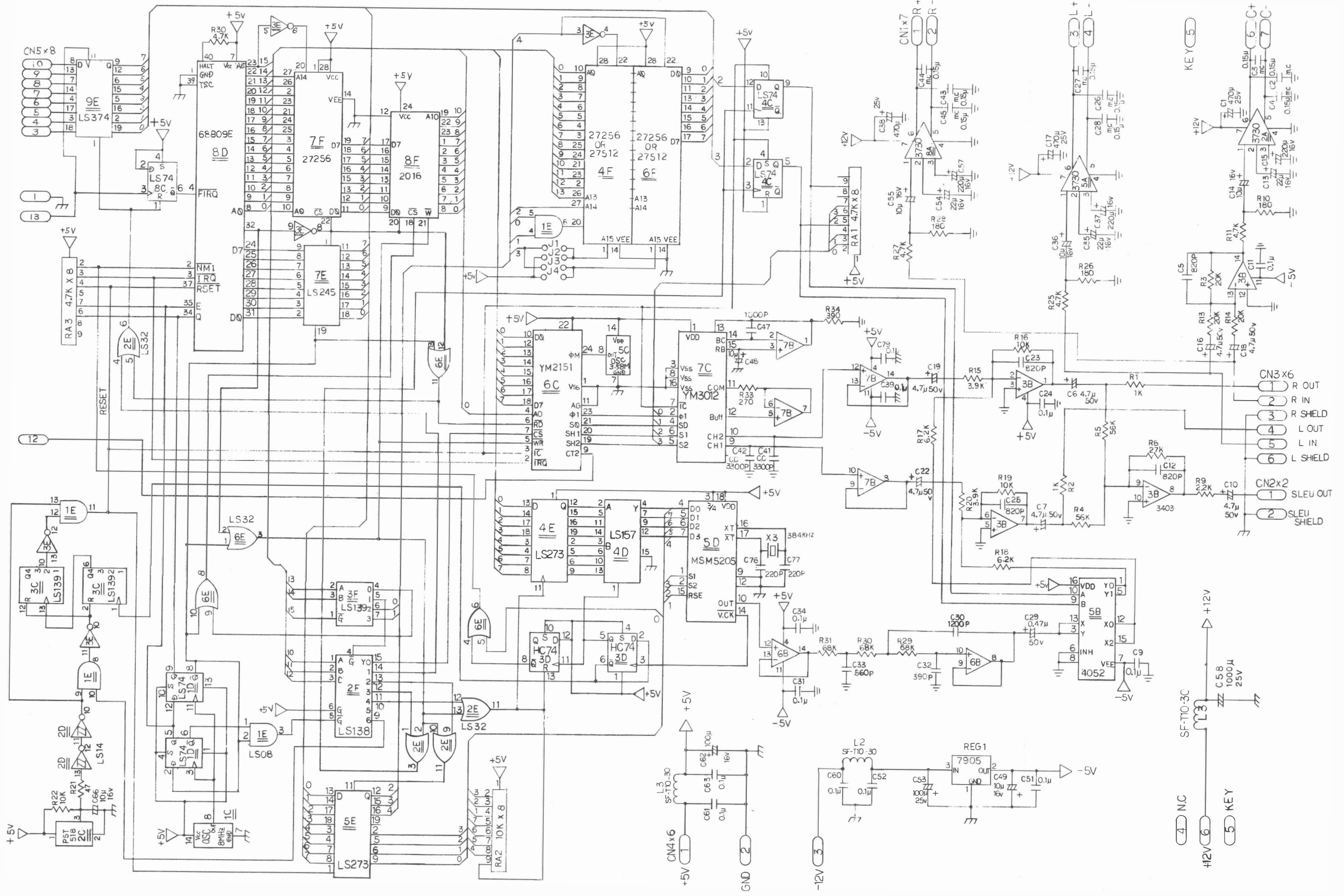
- CA1 28
- CB1 11
- CA1 16
- CB1 12
- CA2 18
- CB2 13
- 14
- 19
- 17





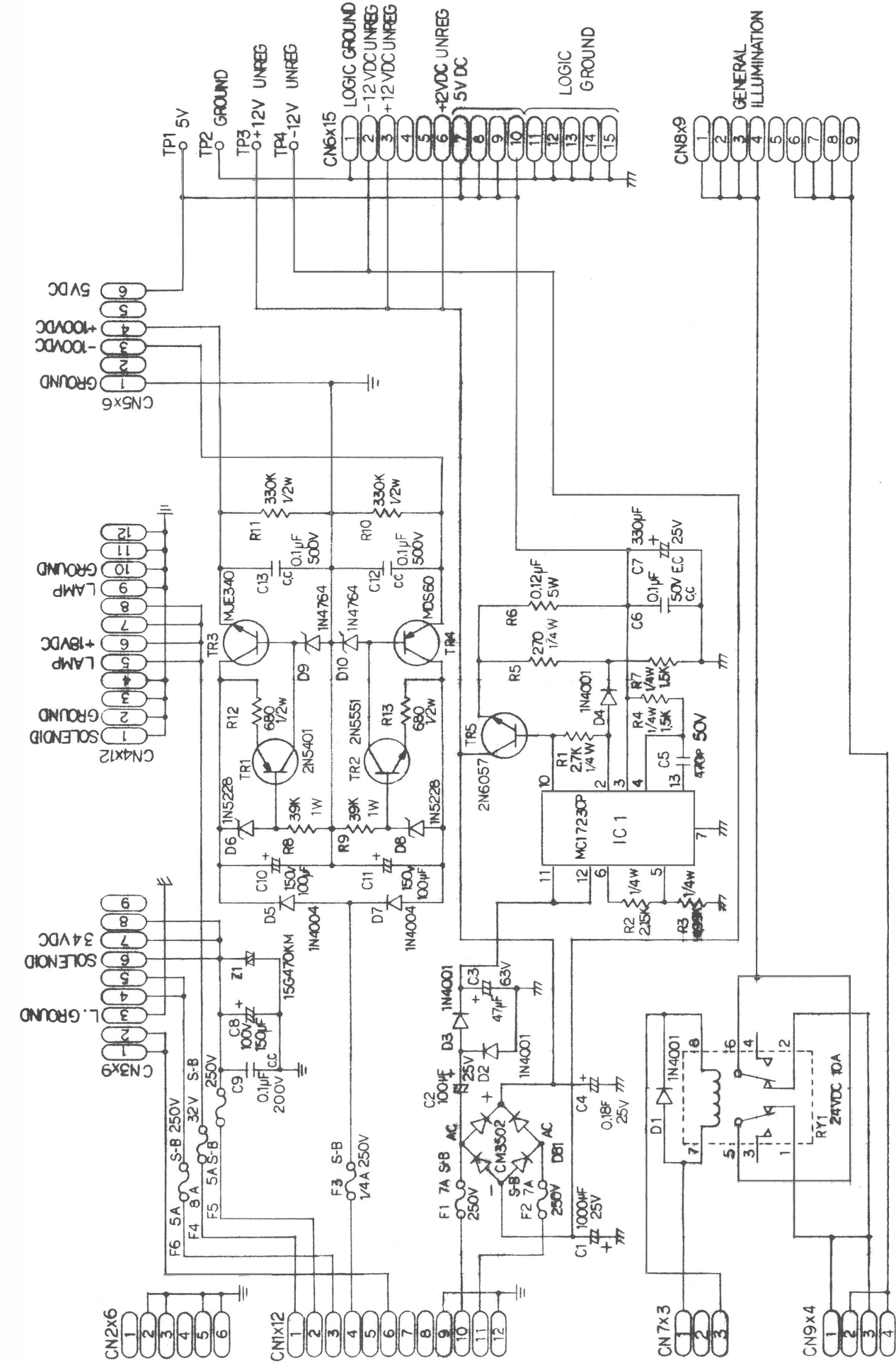
INS234-x6



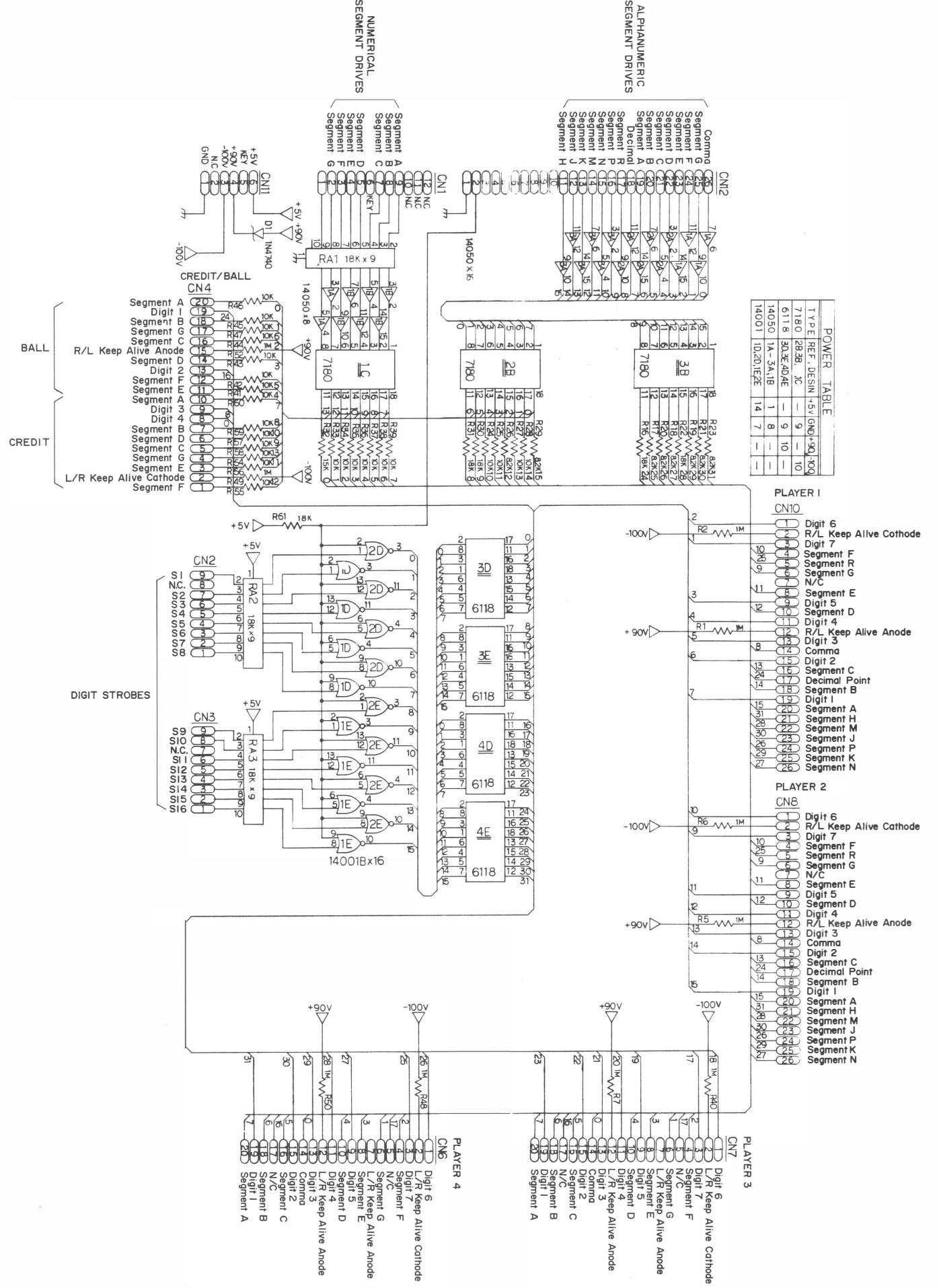


**DIGITAL STEREO SOUND BOARD SCHEMATIC**

POWER SUPPLY SCHEMATIC

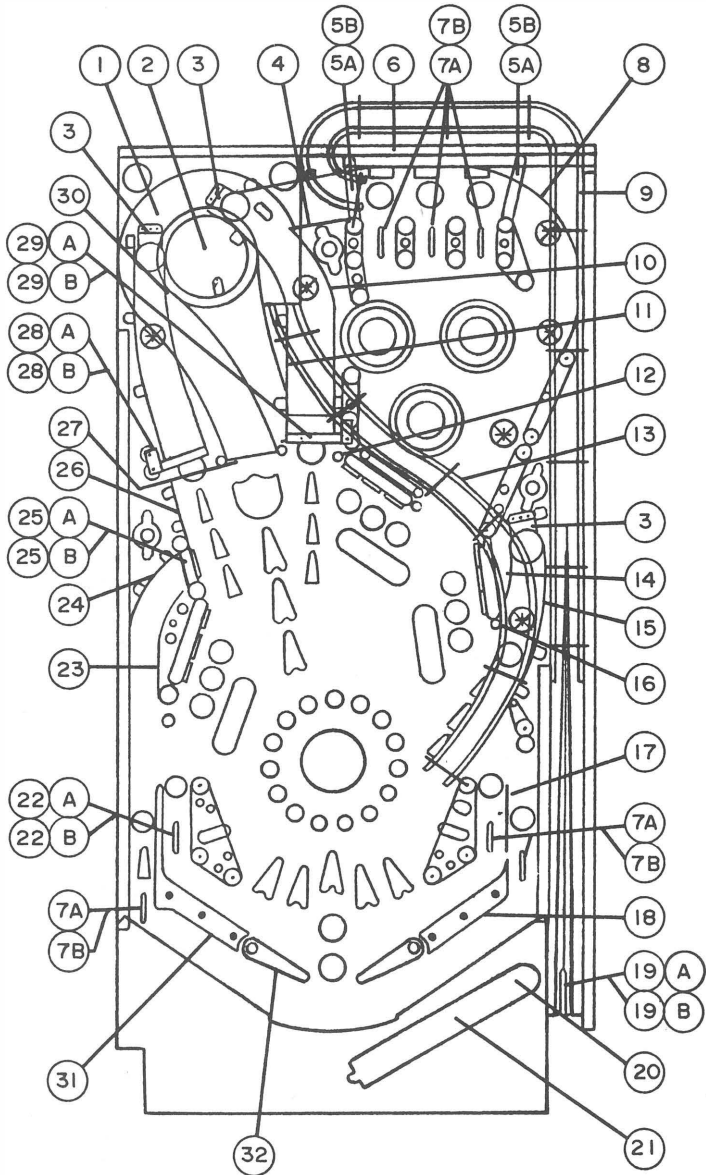


POWER SUPPLY SCHEMATIC / MASTER DISPLAY SCHEMATIC



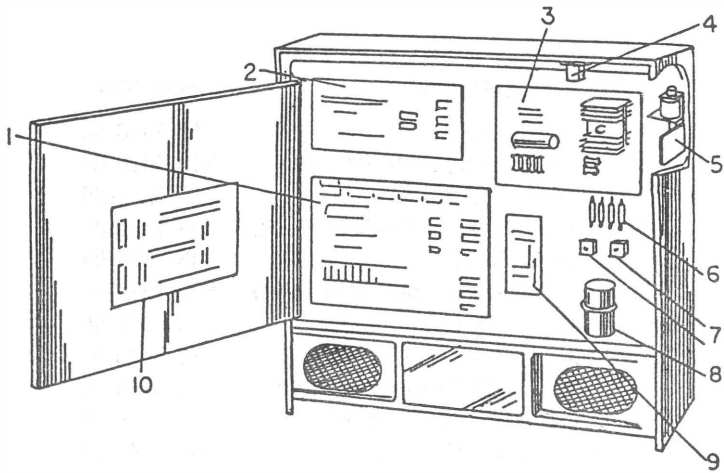
MASTER DISPLAY SCHEMATIC

# PLAYFIELD PARTS ILLUSTRATION



ITEM	DESCRIPTION	PART NO.
1	RAMP ASSY	515-5028-00
2	LIGHT INSERT RAMP ASSY	515-5026-00
3	BALL STOP BRKT	535-5217-00
4	WIRE FORM STRAIGHT - 2½"	535-5300-01
5A	WIRE GATE	535-5314-01
5B	MOUNTING BRACKET-GATE	535-5211-01
6	P/F BACK PANEL ASSY	515-5027-00
7A	ROLLOVER WIRE	535-5315-01
7B	ROLLOVER BRACKET-RIGHT	535-5238-01
8	BALL GUIDE - TOP RIGHT	535-5405-00
9	WIRE RAMP - B/S	535-5305-00
10	BALL GUIDE-CENTER RIGHT	535-5404-00
11	BALL GUIDE-CENTER LEFT	535-5403-00
12	MINI-POST-MACH. THD.	530-5005-00
13	WIRE RAMP	535-5306-00
14	WIRE FORM - CURVED	535-5304-00
15	BALL GUIDE-LOWER RIGHT	535-5401-00
16	BUMPER POST-MACH.	530-5007-00
17	WIRE FORM STRAIGHT-3"	
18	RETURN BALL GUIDE-RIGHT	535-5407-00
19A	ROLLOVER WIRE - B/S	535-5313-00
19B	ROLLOVER BRACKET-RIGHT	535-5238-01
20	WIRE FORM AND BRACKET ASSY	500-5042-00
21	SWITCH PLATE ASSY	500-5041-00
22A	ROLLOVER WIRE	535-5315-02
22B	ROLLOVER BRACKET-LEFT	535-5238-02
23	WIRE FORM	535-5303-00
24	BALL GUIDE - LOWER LEFT	535-5400-00
25A	WIRE GATE	535-5314-01
25B	MOUNTING BRACKET-GATE	535-5210-00
26	BALL GUIDE - TOP LEFT	535-5402-00
27	RAMP PLATE	535-5002-00
28A	SPINNING TARGET	515-5004-10
28B	MOUNTING BRACKET - SPINNER RIGHT	535-5213-01
29A	SPINNING TARGET	515-5004-10
29B	MOUNTING BRACKET - 535-5213-02	535-5213-02
30	WIRE FORM - CURVED	535-5202-00
31	RETURN BALL GUIDE - LEFT	535-5406-00
32	FLIPPER ASSY	515-5038-00

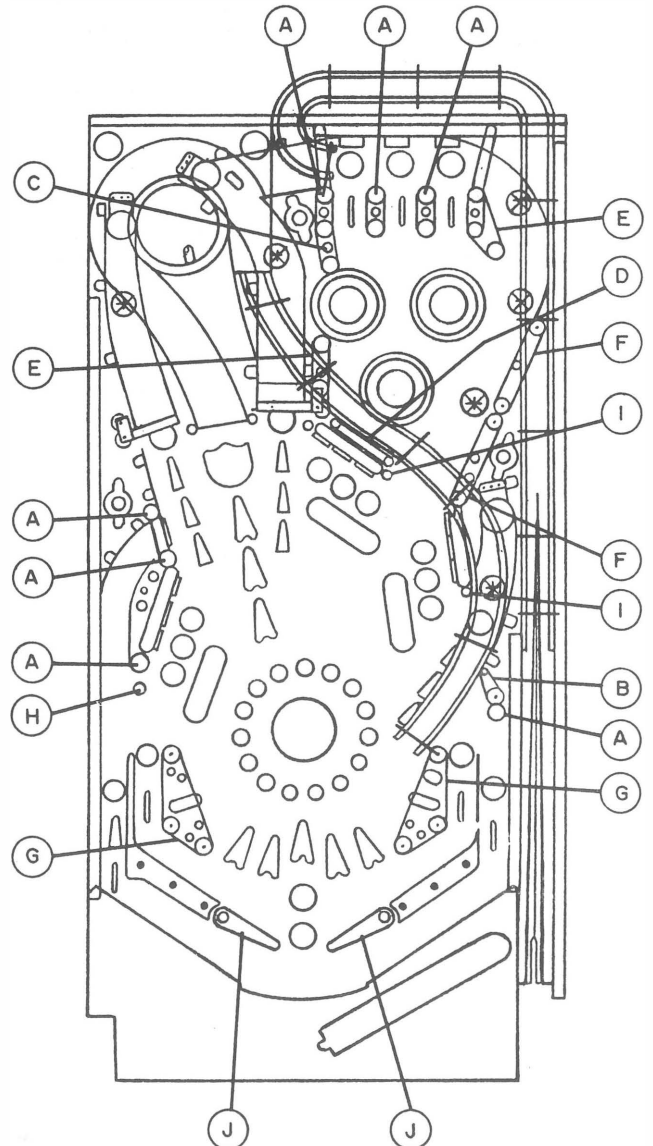
## BACKBOX PARTS ILLUSTRATION



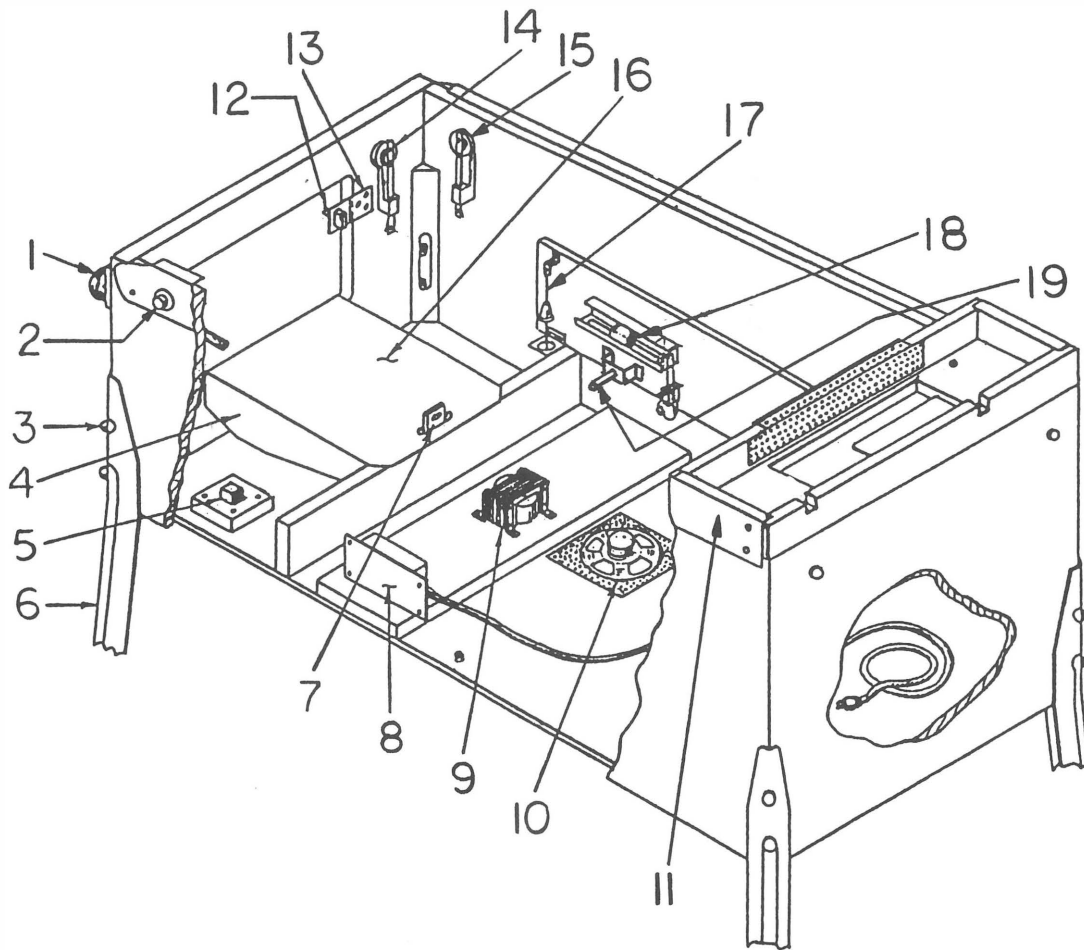
ITEM	DESCRIPTION	PART NO.
1	CPU BOARD ASSEMBLY	520-5003-00
2	SOUND BOARD ASSEMBLY	520-5002-00
3	POWER SUPPLY BOARD ASSEMBLY	520-5000-00
4	RELAY BOARD ASSEMBLY	520-5010-00
5	KNOCKER ASSEMBLY	500-5009-00
6	G.I. FUSE HOLDER	205-5000-01
7	BRIDGE RECTIFIERS	112-5000-00
8	CAPACITOR 2C1	125-5000-00
9	FLIPPER POWER SUPPLY BOARD ASSY	520-5001-00
10	MASTER DISPLAY BOARD ASSEMBLY	520-5004-00

## RUBBER PARTS ILLUSTRATION

ITEM	DESCRIPTION	PART NO.
A	5/16" I.D. RING	545-5025-02
B	3/4" I.D. RING	545-5025-04
C	1" I.D. RING	545-5025-05
D	1 1/4" I.D. RING	545-5025-06
E	1 1/2" I.D. RING	545-5025-07
F	2" I.D. RING	545-5025-08
G	2 3/4" I.D. RING	545-5034-00
H	7/16" O.D. RING	545-5025-17
I	BUMPER POST	545-5009-00
J	FLIPPER RUBBER (RED)	545-5024-02



## CABINET PARTS ILLUSTRATION



ITEM	DESCRIPTION	PART NO.
1	BALL-SHOOTER ASSY	500-5019-02
2	FLIPPER BUTTON	500-5026-02
3	LEG BOLT (CHROME)	213-5000-00
4	CASH BOX BOTTOM	535-5104-00
5	ON/OFF SWITCH DP/ST	180-5001-00
6	LEG (CHROME)	535-5020-10
7	LOCK BRACKET-CASH BOX	535-5215-00
8	POWER INPUT BOX ASSY	515-5018-00
9	TRANSFORMER	010-5000-00
10	SPEAKER-ROUND (6")	031-5000-00
11	SIDE ARMOR-RIGHT	535-5010-01
12	MEMORY PROTECT SWITCH	180-5000-00
13	MEMORY PROTECT SWITCH BRACKET	535-5225-00
14	START SWITCH	180-5016-00
15	TUNGSTON SWITCH-FLIPPER	180-5013-00
16	CASH BOX TOP	535-5013-00
17	PLUMP BOB TILT MECH. ASSY	500-5023-00
18	ROLL TILT ASSY	500-5024-00
19	VOLUME CONTROL	123-5000-00







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